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Water management: distilling criteria for effective management at catchment level

by

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Word Count: 24882

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ABSTRACT

Of all the natural resources available on earth, it could be argued that water is the most important and essential to human health and well-being. Water is a scarce and finite resource and must therefore be used in such a manner as to preserve and protect it. Statistically, South Africa is a water scarce country and water demand is on the increase due to an increase in population, economic development and living standards. The scarcity creates a need to protect the little water South Africa has and so various policies, laws, guidelines and entities exist to control the use and management of water. South Africa has recently put plans into action to establish nine catchment management agencies, as provided for in the National Water Act (Act 36 of 1998), to deal with the management of water at a catchment level. The establishment and operation of these nine institutions are behind schedule and the outcome of the process thus far is below the desired level.

Management of natural resources is done by a wide range of institutions with a variety of management styles according to certain management principles and plans. These management styles can be adjusted to suit the management of most types of natural resources, and because of the interdisciplinary nature of water management, elements from all the management styles can be drawn from to suit water management. Three management and governance styles or concepts were identified for this study. The characteristics and principles of these concepts have been divided into different aspects or broad themes of water management. The National Water Act 36 of 1998, specifically the sections related to catchment management agencies, is reviewed to identify the provisions that might be preventing them from adopting the principles of successful management as suggested by the three governance and management styles.

Keywords: Catchment Management Agency; Decentralisation; Delegation; Integrated Water Resources Management; Management and Transition Framework; Assessment.

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CHAPTER 1 INTRODUCTION

1.1 Introduction

South Africa, a water-stressed country, faces a number of water-related challenges and concerns including security of supply, environmental degradation and resource pollution.[1] The limited water resources require careful management to enable provision of basic water services to every citizen, while also meeting the needs of economic growth, without threatening the environmental integrity of water resources.[2] The sustainability of the country's fresh water resources has reached a critical point and its associated management now appears to be at a crossroads.[3]

Throughout South Africa's history, institutional arrangements governing its water sector have been shaped primarily by natural events such as droughts and political events.[4] However, the reforms initiated since 1994 have acquired an entirely new dimension, not only because of their depth and intensity but also because they are part of a countrywide reform programme for social, economic and political reconstruction.[5] One such an example of reform within the environmental sphere is the introduction of catchment management agencies (CMAs).

To manage its water resources more effectively, South Africa has established CMAs to manage water resources at a catchment level. The National Water Act 36 of 1998 (NWA), which sets out the framework for management of water resources in South Africa, includes the establishment of water management institutions, which incorporates both CMAs and Water User Associations.[6]

1.2 Problem statement

The design and establishment of nine CMAs in South Africa was grounded in the belief that these agencies would play an instrumental part in more accountable,

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[1] Department of Water Affairs *National Water Resource Strategy: Water for an Equitable and Sustainable Future* (2013a).
[2] See 1.
[3] See 1.
[4] R M Saleth & A Dinar 'Water institutional reforms: Theory and practice' (2005) 7(1) *Water Policy* 1–19.
[5] See 4.
[6] Department of Water Affairs and Forestry *Establishing a Catchment Management Agency: Guide 1 in the CMA/WUA guide series* (n.d) Pretoria.

participatory and efficient water resource management. CMAs are based on the concept of decentralised natural resource management as an effective way to deal with water resource challenges and constraints. The decentralisation of functions to smaller units is supposed to increase the efficiency and effectiveness of public service delivery.[7] However, the challenges related to the shifting of power and functions to lower levels of government are often underestimated as it includes creating new administrative capacities, acquiring new resources, drafting new policies and hiring new personnel.[8] These challenges have slowed the process of establishing CMAs in South Africa substantially, with only two of the nine proposed CMAs currently established and functional, and establishment of the other seven gazetted. In a 2013 update on the CMA establishment projects, the Department of Water and Sanitation (DWAS) stated that all nine CMAs had limited to no capacity to deal with various individual aspects of their projects.[9] It is therefore obvious that problems in the establishment process are not being dealt with effectively, with little progress towards improvement.

1.3 Study hypothesis

This study proposes that CMAs have not been properly established and become functional because of the reasons mentioned in section 1.2. This study hopes to address some of the problems facing CMAs in the establishment and management processes by means of an assessment criteria designed specifically to allow CMAs to assess their current position of development and management. The study sets up a theoretical matrix based on literature against which CMAs may assess their progress and their level of successful management. After assessment, the study hopes to recommend how CMAs could improve their management to take on more responsibility regarding their duties and functions, and in so doing how they could become fully functioning institutions (or responsible authorities) with a greater degree of independence.

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[7] M Steinich 'Monitoring and Evaluating Support to Decentralisation: Challenges and Dilemmas' in *European support for democratic decentralisation and municipal development- A contribution to local development and poverty reduction* (2000) Maastricht: European Centre for Development Policy Management.

[8] P Heller 'Moving the State: The Politics of Democratic Decentralization in Kerala, South Africa, and Porto Alegre' (2001) 29(1) *Politics & Society* 131–163.

[9] Department of Water Affairs *Third national steering committee progress and lessons learned on the establishment of CMAs by the regions* (2013b).

1.4 Research questions

The following are the main and secondary research questions the study hopes to answer.

Main research question:

What are the assessment criteria to determine whether CMAs are governing and managing water resources successfully?

Secondary research questions:

1 What are the different theories and concepts of governance and management that can be used to assess the management of CMAs?

2 What are the defining characteristics of each of the theories and concepts and how do these characteristics contribute to successful management?

3 Can the characteristics of successful management be divided into categories to set up a matrix against which to assess CMAs?

4 Are CMAs implementing the principles identified in the matrix?

5 How can CMAs implement the principles of good governance and management to become more responsible water management institutions?

1.5 Study rationale

Implementation of CMAs was supposed to be the cornerstone of the rescaling process of the South African water reform policy.[10] Yet, less than 10 years after the adoption of the NWA, the process was suspended for 4 years and by 2012, only two CMAs had been established and seven gazetted.[11] By adopting the NWA, the 'need for the integrated management of all aspects of water resources, and, where appropriate, the delegation of management functions to a regional or catchment level so as to enable everyone to participate', was recognised.[12] The NWA prescribes that CMAs have inherent and initial functions upon establishment, and thereafter, once it is confirmed that the CMA may act as the responsible authority, the Minister may delegate

[10] M Bourblanc & D Blanchon 'The challenges of rescaling South African water resources management: Catchment Management Agencies and interbasin transfers' (2013) 519 *Journal of Hydrology* 2381–2391.
[11] See 10.
[12] See 10.

or assign powers to it. Thus far, there has been uncertainty as to when a CMA can become a 'responsible authority', which has resulted in a delay in the delegation and assignment of powers to CMAs.

A study of progress reports and policy documents drafted by the DWAS makes it clear that the process of establishing and managing CMAs is not progressing as fast as intended, which has led to communities, stakeholders and government questioning the process. Little research has been done to establish why CMAs are not functioning and performing in the way they were envisioned, or why there has been a delay in delegating or assigning powers. CMAs were established in the hope that water management could be delegated to localised units of management. For control to be delegated to local level, the authorities responsible for management at that lower level must have the capacity to deal with the responsibilities for water management. The capacity to manage water efficiently is severely lacking at these lower levels, however, and that makes the task of delegating management to them challenging. By using the different management concepts and assessing CMAs, this study hopes to identify gaps in the provisions of the NWA preventing CMAs from effectively taking on the roles that should be delegated to them. This study also hopes to gain insight into possible solutions to speed up the CMA establishment process.

1.6 Methodology

This study will be a desktop study in the form of an assessment of CMAs. The study reviews literature and sets up a matrix against which CMAs can be assessed according to different themes or aspects of water management. To construct the assessment matrix, the study relies on literature from various international and South African sources within the sphere of water governance.

1.7 Theoretical underpinnings

With the adoption of the NWA, the South African government officially recognised a 'need for the integrated management of all aspects of water resources, and, where appropriate, the delegation of management functions to a regional or catchment level so as to enable everyone to participate.'[13] The new act was largely inspired by the

[13] See 10.

international trend towards the standardisation of water policies and the so called best practices of water resource management.[14] Of the international standards, the ones that have gained the most attention and acceptance are the principles that emerged during the United Nations Earth Summit in Rio de Janeiro in 1992, which is discussed in more detail below.[15] Two of the most important concepts adopted in the new act are decentralisation and Integrated Water Resource Management (IWRM), both of which will be briefly introduced in this chapter and expanded on in Chapter 2.

According to the World Bank, decentralisation refers to the transfer of authority and responsibility for public functions from the central government to subordinate or semi-independent government organisations and/or the private sector.[16] There are various forms of decentralisation, namely political, administrative, fiscal and market decentralisation.[17] Any analysis of decentralised natural resource policies needs to go beyond the understanding of how the decisions of local communities are affected by centrally designed policies.[18] Decentralisation is an ambiguous concept and different authors, writing from different angles and disciplines, have attributed different meanings to the term.[19] Most of the confusion arises from using broad and narrow definitions of decentralisation interchangeably.[20] Conceptually it is important to realise that decentralisation always originates at the centre: if there were no centre, there would be no decentralisation but rather two or more completely separate entities.[21] The broader definition of decentralisation usually includes the three categories of deconcentration, delegation and devolution, which are explored in the next chapter.[22]

IWRM, as defined by the Global Water Partnership (GWP), is a process that promotes the coordinated development and management of water, land and related resources to maximise economic and social welfare in an equitable manner without

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[14] M Bourblanc 'Transforming water resources management in South Africa: 'Catchment Management Agencies' and the ideal of democratic development' (2012) 24(5) *Journal of International Development* 637–648.
[15] See 14.
[16] The World Bank Group 'Administrative Decentralization' available at *http://www1.worldbank.org/publicsector/decentralization/admin.htm,* accessed on 2 June 2015.
[17] See 16.
[18] F Clement 'Analysing decentralised natural resource governance: proposition for a 'politicised' institutional analysis and development framework' (2010) 43(2) *Policy Sciences* 129–156.
[19] J De Visser *Developmental Local Government: A case study of South Africa* (2005) Antwerpen: Intersentia.
[20] See 19.
[21] See 19.
[22] See 19.

compromising the sustainability of vital ecosystems.[23] CMAs, because of their integrated nature, also rely on other sectors, such as the political and agricultural sectors, to support the equitable use and management of water. The integrated approach co-ordinates water resources management across sectors and interest groups, and at different scales, from local to international.[24] It emphasises involvement in national policy and law-making processes, establishing good governance and creating effective institutional and regulatory arrangements as routes to more equitable and sustainable decisions.[25] A range of tools, such as social and environmental assessments, economic instruments and information and monitoring systems, support this process.[26]

IWRM helps to protect the world's environment, foster economic growth and sustainable agricultural development, promote democratic participation in governance, and improve human health.[27] Worldwide, water policy and management are beginning to reflect the fundamentally interconnected nature of hydrological resources, and IWRM is emerging as an accepted alternative to the sector-by-sector, top-down management style that previously dominated.[28]

Water resource management is concerned with the government functions, tasks and competencies within the environmental sphere of management, all of which fall under the umbrella of public administration.[29] Natural resource management, and thus water management, should be seen as a governance model to more fully understand the complexities and aspects involved in the management of water resources. The OECD defines water governance as 'the range of political, social, economic, and administrative systems that are in place to develop and manage water resources, and the delivery of water services, at different levels of society'.[30] Decentralisation, as used

[23] D Malzbender & A Earle *Water Resources of the SADC : demands, dependencies, and governance responses* (2009) Cape Town.
[24] Global Water Partnership & International Network of Basin Organisations *A Handbook for Integrated Water Resources Management in Basins* (2009) Sweden: International Network of Basin Organisations; Global Water Partnership.
[25] See 24.
[26] See 24.
[27] Global Water Partnership 'What is IWRM?' available at: *http://www.gwp.org/en/The-Challenge/What-is-IWRM/,* accessed on 15 August 2015.
[28] See 27.
[29] F Jaspers *Towards Integrated Water Resources Management: International experience in development of river basin organisations* (2014) Khartoum.
[30] A Akhmouch *Water Governance in Latin America and the Caribbean: A multi-level approach* (2012) (2012/04).

in the establishment of CMAs, is an example of a governance model, while IWRM presents itself as a management model for water resources.

The boundary between governance and management is not hard and fast.[31] In particular, both the maturity and the size of a government or institution will influence the dividing line and the degree of separation between governance and management structures.[32] Less mature governments or institutions may take time to establish formal governance mechanisms.[33] Smaller institutions with limited staffing and financial resources may tend to blend responsibilities between those who govern and those who manage, and to call on governing body members to be more involved in specific day-to-day management decisions.[34]

Governance concerns the structures, functions, processes and organisational traditions put in place within the authorising environment 'to ensure that the institution is run in such a way that it achieves its objectives in an effective and transparent manner.'[35] It is the 'framework of accountability to users, stakeholders and the wider community, within which organisations take decisions, and lead and control their functions to achieve their objectives.'[36] Good governance adds value by improving the performance of an institution through more efficient management, more strategic and equitable resource allocation and service provision, and other such efficiency improvements that lend themselves to improved development outcomes and impacts.[37] It also ensures the ethical and effective implementation of its core functions.[38]

Management concerns the day-to-day operation of an institution within the context of the strategies, policies, processes and procedures established by the governing body.[39] Whereas governance is concerned with 'doing the right thing,' management is concerned with 'doing things right.'[40]

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[31] Independent Evaluation Group of the World Bank *Sourcebook for Evaluating Global and Regional Partnership Programs: Indicative Principles and Standards* (2007) Washington D.C.: Independent Evaluation Group of the World Bank.
[32] See 31.
[33] See 31.
[34] See 31.
[35] See 31.
[36] See 31.
[37] See 31.
[38] See 31.
[39] See 31.
[40] See 31.

One way to think about the difference between management and governance is that governance determines the 'what' – what the organisation does and what it should become in the future.[41] Management determines the 'how' – how the organisation will reach those goals and aspirations.[42] The questions of 'what' and 'how' cannot and should not be answered in isolation from each other. Both are crucial questions within any organisation. Keeping both questions in mind in the daily operations of a company is helpful because to achieve the 'how', there must first be concrete answers to 'what' i.e. what the organisation wants to achieve. The relationship between governance and management is important: the day-to-day operation of an institution will be unsuccessful if its policies, strategies, processes and procedures aimed at answering the 'how' are not mindful of the bigger picture and not concerned with functioning within the structure and framework that will ensure the institution is run to achieve its objectives in an effective and transparent manner.[43] The relationship between governance and management, and the relationships among all the aspects of water management will become evident in the next chapter where the principles of effective management and governance are examined.

1.8 Structure of the study

This study is divided into five chapters. This chapter introduces the project, along with the problem statement, the research questions, the study rationale, the methodology and the study's theoretical foundation.

Chapter two introduces and explains the concepts used to construct the assessment matrix. Each concept is discussed in turn, along with the reasons behind choosing the specific concept and what its selection would contribute to this project.

Chapter three constructs the assessment matrix based on the concepts introduced in chapter two. The principles and characteristics of the concepts are divided into groups according to their nature (e.g. administrative, financial, capacity and technological).

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[41] ACT Council of Social Service 'Organisations Information Kit' available at: *http://www.actcoss.org.au/oik/infosheets/governance/boardnEOresponse.html,* accessed on 4 May 2015.
[42] See 41.
[43] See 31.

Chapter four assesses CMAs based on the different criteria of the matrix set out in chapter three, and makes recommendations on how CMAs can become more efficient and effective regarding management based on the principles identified in chapter three. Chapter five concludes the study and is followed by the bibliography.

CHAPTER 2 WATER MANAGEMENT THEORIES AND CONCEPTS

2.1 Introduction

Water resource management is concerned with the government functions, tasks and competencies within the environmental sphere of management, all of which fall under the umbrella of public administration.[44] To more fully understand the complexities and aspects involved in the management of water resources, natural resource management, and thus water management, should be seen as a governance model. Environmental governance refers to the processes of negotiation, coordination and collaboration between state agencies, private actors and non-governmental organisations directed towards the joint realisation and implementation of a plan addressing an environmental problem.[45] Although the governance literature proposes several definitions of exactly what governance is, most rest on three dimensions: authority, decision-making and accountability.[46]

The dimension of authority asks who has a voice in making decisions. The principal actors in this dimension are the political leaders formulating the laws and guidelines CMAs have to follow. Within the CMA establishment process, ordinary citizens typically do not have a voice in the decision-making process unless invited to participate by government officials. The decision-making dimension of governance is about how decisions are made. Decisions can be made, for instance, by consulting expert groups or objective advisory committees, or through the board of directors achieving consensus on a certain matter, to name a few. Accountability within governance is concerned with who is held accountable. Seeing as the Minister is the responsible authority for water management, when there is no CMA to take control, the Minister remains ultimately responsible and can therefore be held accountable for water management decisions. Where a CMA is operational, the CMA is accountable for all water management matters as delegated and assigned to it by the Minister. Relating the three dimensions of governance as described above to CMAs would mean that a CMA holds authoritative power over water management and can ultimately determine how

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[44] See 29.
[45] G Kallis, M Kiparsky, & R Norgaard 'Collaborative governance and adaptive management: Lessons from California's CALFED Water Program' (2009) 12(6) *Environmental Science and Policy* 631–643.
[46] Institute on Governance 'Defining Governance' available at: *http://iog.ca/defining-governance/*, accessed on 2 June 2015.

water is managed, used, conserved and distributed, and thus that a CMA is the institution that can be held accountable for all water-related decisions implemented in respect of those powers or duties assigned or delegated to it, and finally the CMA is accountable to water users and the Minister.

Environmental governance on the other hand should be understood in terms of the concept of sustainability, which is defined as the ability to maintain a desired condition over time without eroding natural, social and financial resource bases, through a process of continual improvement in the form of sustainable development.[47] Sustainability also relates to the integration of various considerations, including the environment, the economy, social factors, environmental governance and management efforts, and public and industry involvement.[48] Sustainability results may be achieved through application and implementation of the various principles of sustainability.[49]

CMAs are legal institutions or entities whose establishment is mandated in the NWA. The governance of water along with all its functions and duties is thus a legally derived function of a CMA. Initially, the governance of water lies with the Minister and is only delegated or assigned to a CMA once certain criteria have been met. CMAs are therefore an example of a decentralised resource governance model because control over a resource is passed from one level of government to another lower level of government. South Africa is just one of many countries moving towards more decentralised units of resource management. The notion of decentralisation and how it relates to CMAs is expanded in the next section of this chapter.

Over the past few years, certain insights have started to undermine the basic assumptions upon which traditional water management is based with its emphasis on technical solutions and command and control approaches.[50] These insights include the following:[51]

1 Water crises are often crises of governance and not resource or technology problems.

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[47] L J Kotze 'Improving Unsustainable Environmental Governance in South Africa : the Case for Holistic Governance' (2006) 9(1) *Potchefstroom Electronic Law Journal* 45.
[48] See 47.
[49] See 47.
[50] C Pahl-Wostl 'Requirements for Adaptive Water Management' in C Pahl-Wostl, P Kabat, & J Möltgen (eds) *Adaptive and Integrated Water Management: Coping with Complexity and Uncertainty* (2008) 1–22 Heidelberg: Springer Berlin Heidelberg.
[51] See 50.

2 Increasing uncertainties due to climate and global change reduce the predictability of the boundary conditions under which water management has to perform.

3 The 'polluter pays' principle and source control are more in line with sustainable water management and have gained increasing support over technical end-of-pipe solutions.

4 Integrated water management has been strongly promoted as more efficient and effective as a guiding principle for water management.

These insights, along with the failures of centralised control, led to the development of new theories and concepts focused on more efficient and effective water management, some of which are discussed and used in this study.

The aim of the rest of this chapter is to expand on the idea of water management as a decentralised model of governance and to introduce the theories used in the next chapter to construct criteria to evaluate water management at the catchment level. The two theories under discussion are Integrated Water Resources Management and the Management and Transition Framework. The theories operate within the sphere of water management and are used by various institutions to aid successful water management and add to the planning of water governance regimes. The theories, together with a decentralised governance model, contain principles and characteristics associated with effective water management and are thus applied by various water management authorities around the world. Together they contribute to a more complete picture of water management and should not be viewed in isolation but rather as complementary. The two theories were chosen to help develop a more holistic picture of effective water management against the backdrop of decentralised water resource management as each adds unique characteristics to the assessment matrix.

2.2 Decentralisation

The failures of centralised forms of state intervention, the realisation that deconcentration had its limits,[52] and the renewal of free-market theories embodied by structural adjustment and macro-economic stabilisation policies are all reasons for

[52] Discussed in 2.1.

adapting public administration towards decentralisation.[53] One of the main reasons decentralisation has become popular in resource management is because resources can be managed more efficiently by many smaller units than by one large overarching authority, on the basis that citizens of a specific area are aware both of their own needs and of potential solutions to local problems.[54] Resource administration from a centralised perspective is arguably significantly more difficult than administering resources at local level. Decentralisation decongests central government's work and further, it divides work and projects into manageable sizes.[55] Powers or duties can either be assigned or delegated to decentralised units. Assignment refers to the full, legal transfer of powers or functions to another authority where the powers or functions may not be revoked and the authority to which they are assigned takes full responsibility for the powers and functions.[56] Delegation refers to a partial transfer of powers and functions that may be revoked at any moment when the authority to which it has been given does not exercise the powers or functions in a responsible manner.[57] The political nature of centralised control may pose a threat to water resources because it is possible that more attention, and possibly funding, may be given to certain water basins or CMAs over others, and that certain projects may take priority above others due to political influence. Several forms of decentralisation can occur within a country as well as within the different sectors in that country. The broader definition of decentralisation usually includes the three categories of deconcentration, delegation and devolution.[58]

Deconcentration occurs when the central government disperses responsibility for specified services to its regional branch offices.[59] This is the mildest form of decentralisation since it does not involve transfer of authority to local government.[60] In the context of deconcentration processes, different ministries transfer functions and authority to regional and/or local out-posts.[61] This limited form of decentralisation only

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[53] J Bonnal 'A History of Decentralisation' available at: *http://www.ciesin. columbia.edu / decentralization/English/General/history_fao.html,* accessed on 2 June 2015.
[54] E I Edoun & P M Jahed 'The merits of decentralisation and local economic development South Africa' in *Global Action for Africa's Development* (2009) Pretoria: Global Action for Africa's Development.
[55] See 54.
[56] T L Stark 'Assignment and Delegation' In T L Stark (ed) *Negotiating and Drafting Contract Boilerplate* (2003) New York: ALM Publishing.
[57] See 56.
[58] See 19.
[59] See 16.
[60] See 16.
[61] See 53.

concerns relations between central level organs and their lower tiers.[62] Deconcentration implies that decision-making remains at the centre, with other levels of government being limited to transmitting orders and implementing decisions.[63] Though decisions regarding crucial issues are made at the centre, levels with deconcentrated authority may by delegation make decisions concerning issues of less importance.[64] When initiating a deconcentration process, governments mostly seek to bring services closer to citizens, either by moving personnel to a particular location, or by assigning some responsibilities to regional or local authorities while retaining administrative control over locally taken decisions.[65] The defining element of deconcentration is that allocation of responsibility occurs within the hierarchy of central government.[66]

Devolution is an extensive form of decentralisation whereby central government transfers responsibility for decision-making, finance and management to local governments that have a clear and legally recognised jurisdiction over which they exercise authority, within which they perform public functions and to which constituents they are accountable.[67] It is different from delegation in that a permanent placement of a power at a particular level is intended.[68] It involves the transfer of authority and power to local units of government, which operate in a quasi-autonomous manner outside the direct administrative control and structure of the central government.[69] Central government has supervisory powers only.[70] It therefore entails conferring the necessary legal powers to discharge specified functions upon formally constituted local structures characterised by a measure of autonomy.[71] This specific form of decentralisation is not used within the South African water management sector because water management is transferred directly to CMAs rather than to another, lower level of government. Furthermore, CMAs have no clear, recognised jurisdiction over water management unless the Minister assigns it to the CMA.

The last type of decentralisation, namely delegation, is far more extensive. Through delegation central governments transfer responsibility for decision-making and

[62] See 53.
[63] See 53.
[64] See 53.
[65] See 53.
[66] See 19.
[67] See 16.
[68] See 19.
[69] See 16.
[70] See 19.
[71] See 16.

administration of public functions to semi-autonomous organisations not wholly controlled by the central government, but ultimately accountable to it.[72] Governments delegate responsibilities when they create public enterprises or corporations, housing authorities, transportation authorities, special service districts, regional development corporations or special project implementation units.[73] Usually these organisations have a great deal of discretion in decision-making. They may be exempt from constraints on regular civil service personnel and may be able to charge users directly for services.[74] Once a power or a function has been delegated to an authority, it may still be removed or taken back by the delegating authority.[75] In France, for instance, delegation in the water sector is becoming controversial due to certain highly publicised scandals in the past and the generally higher prices accompanying such scandals due to the instability it creates, which is seen as an index of the inefficiency of delegation.[76] One such scandal involved the mayor of a city, along with several government officials and private water companies, being accused of corruption. Suez and Vivendi, at that time the largest private water companies in the world, came under scrutiny in a host of criminal and civil cases, with accusations including bribery of public officials, illegal political contributions, kickbacks, price fixing, operating cartels and fraudulent accounting.[77] The question now being asked is whether the objective pursued by the delegating municipality is motivated less by the desire to improve management and service to its consumers than by a desire to solve its own management and financial problems.[78] As mentioned above, the defining element of deconcentration is that the responsibility is transferred within the hierarchy of national government, in contrast to delegation, which refers to the transfer of responsibility outside of the hierarchy of national government.[79] Interestingly, Ribot does not agree that delegation is a form of decentralisation.[80] He claims that the privileges of the lower authority are open to the abuses of the allocating authority that makes, gives and takes away the privileges as it pleases, and that those

[72] See 16.
[73] See 16.
[74] See 16.
[75] See 16.
[76] E A Clark & G Mondello 'Water management in France: delegation and market based auto-regulation' (2003) 26(3) *International Journal of Public Administration* 317–328.
[77] J Godoy 'Water and power: The French connection' available at: *http://www.icij.org/ project/water-barons/water-and-power-french-connection,* accessed on 6 September 2015.
[78] See 76.
[79] See 19.
[80] J C Ribot 'Democratic Decentralisation of Natural Resources: Institutional Choice and Discretionary Power Transfer in Sub-Saharan Africa' (2003) 23(1) *Public Administration and Development* 1–18.

receiving delegated authority only act for those who delegate it, whether by law or administratively.[81] Effectively, those receiving delegated authority become subjects of those higher authorities and often have little discretion of their own.[82] Ultimately, he states, the means of transfer is a defining aspect of decentralisation and more broadly democracy because delegation subjects people to central government whims, while legislated transfer or assignment creates local rights, recourse and a space for citizenship.[83]

In the case of CMAs, functions and/or powers may be delegated or assigned.[84] Delegation and assignment are both ways in which powers and functions are decentralised from the national authority to the CMAs. The specific CMA may only exercise its powers and functions once they have been delegated or assigned to it. When a power is assigned to a CMA, it refers to a full transfer of duties or authority exclusively to the CMA, together with the responsibility to perform those duties, whereas delegation implies that the delegated power or duty is carried out on behalf of another authority, and may therefore be taken back by the Minister if the CMA is unable to perform the delegated duties to the Minister's satisfaction. In the case of delegation, the delegating authority remains in control of the power in terms of the NWA. Within South Africa, delegation and assignment are defined by the Constitution, and are used specifically in Schedule 3 of the NWA.[85]

Decentralisation is common in many developing countries, as local governments are increasingly required to play larger roles in providing services, alleviating poverty and facilitating development.[86] A decentralised structure is supposed to improve public service delivery, foster democratisation and strengthen national integration.[87] Decentralised units increase the efficiency and effectiveness of public service delivery, as they are meant to be more relevant to local needs, more flexible, more innovative and cheaper to operate. [88]

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[81] See 80.
[82] See 80.
[83] See 80.
[84] See Schedule 3 of the National Water Act 36 of 1998.
[85] See Section 238 of the Constitution and Chapter 6 of the National Water Act 36 of 1998.
[86] M Andrews & A Shah 'Assessing local government performance in developing countries' in A Shah (ed) *Handbook on public sector performance reviews: Measuring government performance in the delivery of public services* 2 ed (2003) 26 Washington D.C.: World Bank
[87] See 7.
[88] See 7.

Decentralisation by establishing CMAs hopes to achieve the objectives of involving local communities in water resource management and of providing more equitable access to water resources, both of which can be done by implementing different models of water management, two of which are discussed in detail below.

2.3 Integrated water resource management

IWRM is defined as a process that promotes the coordinated development and management of water, land and related resources to maximise economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.[89] IWRM is a cross-sectoral policy approach designed to replace the traditional, fragmented sectoral approach to water resources and management that has led to poor services and unsustainable resource use.[90] IWRM is based on the understanding that water resources are an integral component of the ecosystem, a natural resource, and a social and economic good.[91]

River basins or catchments are increasingly regarded as the most appropriate geographical unit for river management.[92] Jaspers argues that if integrated river basin management is 'the most appropriate tool' to deliver IWRM at a basin scale, then river basin organisations (or CMAs) are increasingly being promoted as the vehicle by which this tool should be implemented.[93] Newson states that the catchment or river basin is an easily appreciated plan projection of the ecosystem requiring management and an area within which the population has one form of common identity.[94] Associated with this trend towards management of river catchments is increasing support for a more integrated approach to that management.[95]

The Agenda 21 action plan for sustainable development states that an integrated approach to the management of river basins would link the natural resource capital of plant and animal species, and of water and land with human resources for their

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[89] See 24.
[90] See 24.
[91] See 24.
[92] S Edwards-Jones 'The River Valleys Project: A Participatory Approach to Integrated Catchment Planning and Management in Scotland' (1997) 40(1) *Journal of Environmental Planning and Management* 125–142.
[93] See 29.
[94] M Newson *Land, Water and Development: Sustainable Management of River Basin Systems* 2 ed (1997) London: Routledge.
[95] See 92.

conservation and sustainable use.[96] This model aligns with the integrated nature of CMAs and the fact that the various aspects that make up water governance cannot be seen in isolation from one another. Water management within the CMA context comprises physical, financial, administrative and political aspects, and one of the challenges of water management is to bring all these aspects into harmony to work towards a common goal of more efficient and effective water management. If CMAs are ever to become fully functioning entities, it will require a holistic management of all the various aspects or spheres of water governance.

One of the ways to bring these aspects into harmony is to follow an IWRM approach to water management – a core element of IWRM being that the many different uses of finite water resources are interdependent. IWRM forms a framework based on principles agreed upon by various nations and NGOs,[97] the most important of which flow from the four Dublin Principles presented at the World Summit in Rio de Janeiro in 1992. The four principles are the following:[98]

1 Fresh water is a finite and vulnerable resource, essential to sustain life, development and the environment.

2 Water development and management should be based on a participatory approach, involving users, planners and policy-makers at all levels.

3 Water has an economic value in all its competing uses and should be recognised as an economic good.

4 Women play a central part in the provision, management and safeguarding of water.

The first principle has been interpreted as a requirement for integrated management that is responsive to the characteristics of water resources.[99] Integration includes technically appropriate water management (surface and groundwater, quality and quantity, water and soil).[100] A consideration of social needs, economic soundness

[96] United Nations *The Global Partnership for Environment and Development: A Guide to Agenda 21/Post Rio Edition* Post Rio ed (1993) New York: United Nations Publishing.
[97] M Wieriks *Performance Assessment of water sectors–methods and considerations for application* (published MSc thesis, Delft University of Technology, 2011).
[98] F Gonzalez-Villarreal & M Solanes *The Dublin Principles for Water as Reflected in a Comparative Assessment of Institutional and Legal Arrangements for Integrated Water Resources Management* (1999) Stockholm.
[99] See 98.
[100] See 98.

and environmental requirements is implied.[101] The ultimate goal is sustainable use and development of water resources.[102]

Legislation relating to the second principle was analysed under the assumption that water-related activities are not confined to the interests of limited groups of users, geographical boundaries, sectoral institutions or national jurisdictions.[103] Generally, meaningful participation is associated with well-defined national policies for which water is either a main component or a relevant input.[104] Policy implementation is usually associated with socially acknowledged, relatively well-informed government organisations with adequate capabilities and appropriate legal mandates.[105]

In Western, Roman-based legislation, the economic aspects of water resources are relevant enough for them to be included within public or private ownership.[106] Systems of rights on water have existed since Roman times.[107] At present, most legislation recognises and protects the property aspects of rights to use water, which is the manner in which law reacts to the economic concept of scarcity.[108] At the same time, water law systems acknowledge the social and environmental dimensions of water through norms intended to protect third parties, the environment and the resource base.[109]

One of the main challenges for IWRM lies in taking these four principles and building a water management model to give effect to the principles as it leads to questions on how to translate policy commitments to IWRM into practice.[110] IWRM has not been without criticism, with some even saying that attempts to implement full IWRM in South Africa are destined to fail and disappoint.[111] The methods to achieve it are often called into question, and various authors have criticised IWRM for its lack of a concrete definition and clearly defined core elements amid growing concern about the

[101] See 98.
[102] See 98.
[103] See 98.
[104] See 98.
[105] See 98.
[106] See 98.
[107] See 98.
[108] See 98.
[109] See 98.
[110] S Carriger *Lessons from integrated water resources management in practice* (2009) Global Water Partnership.
[111] D J Merrey 'Is normative integrated water resources management implementable? Charting a practical course with lessons from Southern Africa' (2008) 33(8-13) *Physics and Chemistry of the Earth* 899–905.

practicality of achieving IWRM objectives as reflected in the GWP definition of IWRM.[112] Where IWRM has been applied as a blueprint, as a checklist of actions, and in a way that does not take into account the specific problems to be solved and the contextual realities, it has not delivered concrete benefits.[113] Huntjens *et al.* argue that the scientific base for IWRM is not yet fully developed and that it lacks both empirical knowledge and concepts that allow effective transfer of successful experiences across basins and frontiers.[114] Instead, more flexible approaches, such as adaptive water management, have been advocated as essential and timely extensions of the IWRM approach to improve the conceptual and methodological base to realise IWRM goals.[115]

The GWP admits that IWRM is not a 'one-size-fits-all' prescription and cannot be applied as a checklist of actions.[116] In its research, it notes that of all the water management regimes studied, none of the cases set out to achieve IWRM, but rather they set out to address a particular water-related problem or developmental challenge.[117] The solutions in most of these cases, however, demanded an approach that went beyond water resources management as it is often narrowly viewed.[118] In several of the cases, an IWRM approach emerged only over time to correct imbalances between economic efficiency, social equity and environmental sustainability.[119]

Other critics have objected to IWRM, regarding it as impractical in the real world because of the challenges of integration.[120] Integration, they argue, makes theoretical sense but cannot easily be implemented.[121] This kind of critique assumes that the purpose of IWRM is integration of all activities that use or have an impact on water resources.[122] However, looking at the original expression of IWRM adopted at the Rio Earth Summit and at successful examples of IWRM in practice, it is clear that IWRM is a

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[112] D Mazvimavi, Z Hoko, L Jonker, I Nhapi & A Senzanje 'Integrated Water Resources Management (IWRM) – From Concept to Practice' (2008) 33(8-13) *Physics and Chemistry of the Earth – Parts A/B/C* 609–613.
[113] See 110.
[114] P Huntjens, C Pahl-Wostl, B Rihoux, M Schlüter, Z Flachner, S Neto, R Koskova, C Dickens & K Isah Nabide 'Adaptive water management and policy learning in a changing climate: A formal comparative analysis of eight water management regimes in Europe, Africa and Asia' (2011) 21(3) *Environmental Policy and Governance* 145–163.
[115] See 110.
[116] See 110.
[117] See 110.
[118] See 110.
[119] See 110.
[120] See 110.
[121] See 110.
[122] See 110.

means to an end; it is the goals to be accomplished and the context – the existing physical and institutional systems – that determine the important elements of integration and when they are needed.[123]

Merrey recommends discarding IWRM altogether, which he considers to have diverted attention from the real problems of 'improving access to reliable water for reducing poverty and improving livelihoods'.[124] Merrey raises fundamental questions about the feasibility of simultaneously achieving IWRM objectives, particularly in developing countries with very little or no water management infrastructure.[125] He is critical about emphasising aspects with no relevance to the poor in southern Africa, for example, water demand management and cost recovery when there is no infrastructure.[126] Part of the problem may lie in the overriding belief that if a country adopts IWRM, all its water resource supply and management problems will be solved.[127]

With all the criticism that IWRM has received, it is easy to ask why it should be implemented or even considered an appropriate method of water management. The concept of IWRM arose in part to help address the failure of traditional approaches to meet development goals without sacrificing environmental sustainability.[128] Even before its formal adoption at the 1992 Earth Summit, much of what is now referred to as IWRM was already being practised.[129] The emergence of IWRM as a concept simply reflected evolving good practice rather than any radical innovation, and it still, at its core, represents the best thinking available on good water resources management.[130] It is clear that if the water sector is going to contribute to meeting the world's emerging challenges, it will have to follow the type of approach IWRM offers: one that considers the integrated and interconnected nature of the resource, one that provides mechanisms for negotiation and conflict resolution among different stakeholders, and one that encourages adaptation and that can accommodate shifting physical, political and economic realities.[131] The GWP has found that where IWRM has been

[123] See 110.
[124] See 112.
[125] See 112.
[126] See 112.
[127] See 112.
[128] See 110.
[129] See 110.
[130] See 110.
[131] See 110.

implemented, institutions have been established and resources provided to support it, a wide range of positive development outcomes have followed.[132] IWRM should not be seen as a goal, but as a means to achieve developmental goals such as eradication of poverty and environmental sustainability.[133] It should be seen as an approach, a perspective, and a way of looking at problems and how to solve them.[134] IWRM being a fuzzy concept does not mean it is an invalid method of water management.

Van der Zaag argues that three important considerations need to be considered with respect to IWRM: 1) that IWRM requires institutional capacity to integrate, which often is a scarce resource; 2) that IWRM is neither solution nor recipe, but rather a perspective or way of looking at problems with a view to solving them through transparent and inclusive decision-making processes; and 3) that IWRM should explicitly deal with the fact that water tends to build asymmetrical relationships among people, communities and nations.[135] Jønch-Clausen and Fugl propose a simple framework of three elements to move towards IWRM. They suggest that concurrent development and strengthening of three elements is needed: an enabling environment, appropriate institutional roles and practical management instruments.[136] The enabling environment comprises national, provincial and local policies and legislation,[137] which constitute the 'rules of the game', to enable all stakeholders to play their respective roles.[138] The 'rules' should promote both top-down and bottom-up participation of stakeholders, from national level down to village or municipality level, or from the level of a catchment or watershed up to river basin level.[139] Government's role in the enabling environment should be that of activator and facilitator rather than top-down manager.[140] The formulation of national water policies, the enactment and enforcement of water resources legislation, the separation of regulation from service provision functions, and encouragement and scrutiny of the private sector are important aspects of government's

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[132] See 24.
[133] See 112.
[134] P Van der Zaag 'Integrated Water Resources Management: Relevant concept or irrelevant buzzword? A capacity building and research agenda for Southern Africa' (2005) 30(11–16) *Physics and Chemistry of the Earth* 867–871.
[135] See 134.
[136] T Jønch-Clausen & J Fugl 'Firming up the Conceptual Basis of Integrated Water Resources Management' (2001) 17(4) *International Journal of Water Resources Development* 501–510.
[137] See 136.
[138] See 136.
[139] See 136.
[140] See 136.

role.[141] All stakeholders have a role to play in enhancing access to water, bringing about a balance between conservation and development, and in managing water as an economic and social good.[142] Governance and institutional roles are an area where stage of development, financial and human resources, traditional norms and other circumstances play a large part in determining what is most appropriate.[143] Nevertheless, institutional development is critical everywhere to the formulation and implementation of IWRM policies.[144] Clear demarcation of responsibilities between actors, adequate co-ordination mechanisms, the filling of jurisdictional gaps and the elimination of overlaps, and the matching of responsibilities to authority and to capacity for action are all parts of institutional development.[145] Finally, a management 'toolbox' with practical instruments should be developed to help water managers get their jobs done.[146] Jønch-Clausen and Fugl conclude that the art of IWRM lies in selecting, adjusting and applying the right mix of these tools for a given situation.[147]

The IWRM approach calls for water management to take place in an integrated and inclusive manner and it recognises that development of resources takes place in political, administrative and physical environments. One way for IWRM to be inclusive is to involve stakeholders in the water management process. Planners and managers, particularly those dealing with environmental management issues, consider participation of all stakeholders and maintaining vital functions of ecosystems as critical elements of IWRM.[148] If IWRM is about the relationship among water users and between water users and government, it presupposes good governance; the sad fact that many people are still without adequate water highlights the political nature of water use decisions.[149]

Once national IWRM plans are developed, the challenge is to ensure they are implemented effectively.[150] In this respect, basin managers are at the forefront.[151] They work in a variety of contexts as water governance frameworks set up by governments to

[141] See 136.
[142] See 136.
[143] See 136.
[144] See 136.
[145] See 136.
[146] See 136.
[147] See 136.
[148] See 112.
[149] See 134.
[150] See 24.
[151] See 24.

carry out plans differ.[152] Devising appropriate institutional responses lies at the heart of the IWRM approach and enables governments and basin managers to make a significant contribution to managing resources equitably and sustainably.[153] Within CMAs, one of the primary challenges has been to translate policies and plans into action, and this has partly been because of a lack of knowledge and capacity to undertake the process of implementing IWRM. Sustainable management of water resources and implementation of IWRM cannot be realised unless current water management regimes undergo a transition towards more adaptive water management.[154]

In 2008, the International Conference on IWRM was held in South Africa and it concluded that IWRM as a tool has stood the test of time and has proved relevant in providing a flexible enough framework to accommodate all local variations, be they environmental, social, political or economic in nature.[155] South Africa has been fast to embrace IWRM within its water management legislation, and central to the water reform process that took place in South Africa after 1994 is the establishment of the principles of equity and sustainability as cornerstones in water management and allocation, and the recognition that catchments, rather than administrative boundaries, form the basis for water resource management.[156] These changes underscore the emergence of a holistic approach that recognises the political, technical, socio-economic, environmental and technical dimensions of water.[157] The framework and philosophy that guided the process of change is captured in the concept of IWRM, which in turn is envisaged in the NWA and recognises catchments as complex systems by acknowledging linkages in scale and across disciplines, and the adoption of iterative and adaptive approaches.[158] The NWA's preamble recognises that the ultimate aim of water resource management is to achieve the sustainable use of water for the benefit of all users and that the protection of the quality of water resources is necessary to ensure sustainability of the nation's water resources in the interests of all water users. Thus, two of the main

[152] See 24.
[153] See 24.
[154] See 50.
[155] E Karar 'Integrated water resource management (IWRM): Lessons from implementation in developing countries' (2008) 34(6) *Water SA* 661–662.
[156] S Pollard & D du Toit 'Towards Adaptive Integrated Water Resources Management in Southern Africa: The Role of Self-organisation and Multi-scale Feedbacks for Learning and Responsiveness in the Letaba and Crocodile Catchments' (2011) 25(15) *Water Resources Management* 4019–4035.
[157] See 156.
[158] See 156.

principles of the NWA, namely sustainability and equity, are given effect through the application of IWRM.[159]

2.4 The Management and Transition Framework

Numerous arguments have been put forward regarding the need for a major change in water resources management, and in particular, an increasing awareness of the impact of climate change has led to the insight that water management must become more flexible in order to deal with uncertainties and surprise.[160] One system that hopes to offer such flexibility in dealing with uncertainties in water management is the Management and Transition Framework (MTF). The concept of adaptive management is one of the core concepts informing the creation of the framework. The ever-changing nature of water management, whether due to political, environmental, population or administrative change, makes it crucially important that water management is flexible and able to adapt to changing circumstances. Adaptive management is a pro-active approach to management making it suitable to be implemented within the water resource management sphere.

The MTF, developed by California's Orange County Water District under the NeWater project, is an interdisciplinary conceptual and methodological framework supporting the analysis of water systems, management processes and multi-level governance regimes.[161] The framework was developed following a participatory process involving a wide range of researchers from different disciplines and it combines different conceptual approaches to water management into a meaningful whole.[162] The main concepts informing the MTF are social learning and adaptive governance and its associated characteristics of adaptive and integrative water management regimes.[163] The framework development process made an important contribution to the process of

[159] See 156.
[160] See 50.
[161] C Pahl-Wostl, G Holtz, B Kastens & C Knieper 'Analyzing complex water governance regimes: The Management and Transition Framework' (2010) 13(7) *Environmental Science and Policy* 571–581.
[162] C Pahl-Wostl, J Möltgen, E Ebenhoeh & G Holtz 'The NeWater Management and Transition Framework: state and development in C Pahl-Wostl, P Kabat, & J Möltgen (eds) *Adaptive and Integrated Water Management: Coping with Complexity and Uncertainty* (2008) 74–96 Heidelberg: Springer Berlin Heidelberg.
[163] See 162.

integration within the NeWater project, as well as within other studies of water management.[164]

The MTF improves the scientific understanding of system properties and gives practical guidance on the implementation and transition processes towards more adaptive systems.[165] The MTF also supports and provides guidance for an interdisciplinary approach in the social sciences and across the social-natural science interface.[166] Due to the challenging nature of interdisciplinary water management, the following points were taken into consideration while developing the MTF:[167]

1 The framework must be open to a wide range of scientific concepts and worldviews.
2 The framework must include and address different types of local knowledge and different types of stakeholder perspectives.
3 The framework must be able to handle different types of data, for example, quantitative data and qualitative analysis.
4 The framework must consider multiple spatial and temporal scales and their interdependence.
5 The framework must be scientifically credible and viable to deliver real-world tools to water management practitioners.
6 The framework must be realisable within a limited timeframe.

The MTF integrates various conceptual approaches to tackle specific aspects of the framework; the characteristics of adaptive management are specifically addressed for the purpose of this study.[168] Adaptive management is defined as a systematic process for improving management policies and practices by systemically learning from the outcomes of implemented management strategies and by taking into account changes in external factors in a pro-active manner.[169] Adaptive environmental management was developed as a response to the insight that ecosystems are complex adaptive systems that can be predicted to a limited extent, but only in the past few years

[164] See 162.
[165] See 161.
[166] See 161.
[167] See 162.
[168] See 161.
[169] See 161.

has attention been given to integrating the human dimension of adaptive management.[170]

If adaptive management is to be successful, it needs to be implemented in an enabling environment that is able to support changing dynamics. Social learning has been identified as one of the essential requirements to implement and develop adaptive management.[171] Social learning refers to the capacity of all stakeholders to deal with interests and points of view, and to manage resources collectively in a sustainable way.[172] The most important factors in the social learning process are to develop a shared problem definition and to share an understanding of the physical system at stake, as well as the negotiation processes and strategies, and lastly, to be sure that all communication is clear.[173] In the case of CMAs, this would translate to all employees having clear jobs descriptions and responsibilities, and for all employees to have a common understanding of the daily operations, problems and solutions of a fully functioning CMA. Although not distinctly used as a management model in South Africa, the MTF does offer some valuable insights on how to design management regimes that are flexible in times of change.

Pahl-Wostl identified a list of requirements for adaptive management, some of which are included in the matrix in chapter three. The list includes requirements for the management style of water resources, a description of the appropriate infrastructure needed for adaptive management, the financial resources required for adaptive management and an identification of the most appropriate governance style for water management.[174] Some of the elements of adaptive management, as used in the MTF, include horizontal, broad stakeholder participation, problems being addressed by multiple scales of analysis and management, comprehensive understanding being achieved by open, shared information sources that fill gaps and facilitate integration and financial resources being diversified using a broad set of private and public financial instruments.[175] These elements will be expanded on in the next chapter.

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[170] See 162.
[171] See 162.
[172] See 162.
[173] See 162.
[174] See 50.
[175] See 50.

2.5 Conclusion

This chapter discussed water management as a governance issue, and how CMAs fit into the governance model relating to water management. CMAs are an example of decentralisation because water management responsibilities are delegated to CMAs from a higher level of government. Various forms of decentralisation exist, but in the case of CMAs, the concept of delegation is crucial. Water management can be implemented in various ways by authorities, but the MTF and the IWRM are two of the ways in which governance and management of water plays out in the real world. The next chapter will expand on this chapter by discussing the different principles of decentralisation, the MTF and IWRM, which can be used to assess effective water management regimes at catchment level.

CHAPTER 3 THE INDICATORS AND THE ASSESSMENT MATRIX

3.1 Introduction

One problem with measuring the success or progress of the implementation of CMAs is that limited criteria are available and none developed in the South African context against which to measure the progress. In its 2012 paper on water governance in Latin America and the Caribbean, the OECD identified what it calls multi-level governance and coordination gaps in water management. These seven gaps are the identified areas or spheres of water management in which the planned and intended outcome of a water management policy aimed at successful governance and management is unsuccessful.[176] These failures in policy implementation can be blamed on either the side of the implementing authority, in this case the CMAs or the executive authority – the national government from where powers are delegated. The executive authority might not have delegated powers properly and with clear instructions, which would make successful implementation difficult for the CMAs, or on the other side, the CMAs might not have the knowledge to implement certain aspects of the establishment or other processes, which then results in failed implementation from their side.

The OECD identifies the types of gaps based on the different aspects of water management. These indicators inform the main categories of the assessment matrix. The OECD defines water governance as 'the range of political, social, economic, and administrative systems that are in place to develop and manage water resources, and the delivery of water services, at different levels of society'.[177] The first part of this definition alludes to some of the different spheres or aspects of water governance and water management institutions that are used in the matrix and explained below. For the purpose of this study, five spheres of water governance and management were identified.

The aim of this chapter is to introduce the different principles required to implement decentralisation, the MTF and IWRM effectively as models of water governance and management as discussed in the previous chapter. The principles of all three individual models are extremely important in this chapter because the three

[176] Organisation for Economic Co-operation and Development *Water governance in OECD countries: A multi-level approach* (2011).
[177] See 30.

models together contribute to a more holistic and complete assessment of water management institutions. CMAs are a form of decentralisation and thus it is important to include the principles of an effective decentralised model of governance and management in this chapter. The NWA recognises the need for the integrated management of all aspects of water resources[178] (i.e. IWRM) and therefore it is important to note the principles that contribute to the successful implementation of IWRM in the CMA context. Numerous arguments have been put forward regarding the need for water management to become more flexible to deal with uncertainties and surprise.[179] The MTF offers such flexibility in dealing with uncertainties in water management. The ever-changing nature of water management, whether due to political, environmental, population or administrative change, makes it crucially important that water management is flexible and able to adapt to changing circumstances, which is why principles from the MTF are a necessary inclusion to any water management model. The spheres of water governance and management function together within a CMA and within a specific management model. The models introduced in the previous chapter makes it evident that all aspect of water management are interdependent and cannot be viewed in isolation from one another, and that a system or model is only successful if every individual aspect of that model is compatible and in balance with the rest of the components.

The rest of this chapter is dedicated to introducing each sphere (or aspect) of water governance in turn and discussing the relevant principles for implementation of the concepts in chapter two that correspond to the specific sphere. The principles are summarised at the end of each section and a tabled summary of this chapter is provided in Annexure 1.

3.2 The policy/information and objective sphere

Problems in this sphere of governance and management arise when there is sectoral fragmentation of water related tasks across ministries and public agencies that can occur when diverging or contradictory objectives between levels of government or ministries compromise long-term targets for integrated water policy.[180] Problems arise when there is an asymmetry of information, whether across ministries, levels of

[178] Preamble of the NWA.
[179] See 50.
[180] See 176.

government or local actors involved in water policy, which undermines the decision-making process.[181] Miscommunication between levels of government and the different authorities involved in water management lies at the core of mismanagement in this sphere of water management. In the specific case of CMAs, this could mean a miscommunication between the DWAS and the CMA, or between the provincial department and the CMA or even between municipalities and CMAs.

IWRM can be implemented at many different scales, from the local, as in the case of Australia's Angas Bremer irrigation scheme, to the international as in the case of the Mekong River Basin in Southeast Asia, as well as at every scale in between.[182] What many water management cases make clear is that the river basin is often not the critical focus for management efforts, and that what matters is the linkages across spatial scales and levels of decision-making, with actions at one level reinforcing and complementing action at other levels.[183] A common factor behind several of the success stories in various basins has been a national level policy that provided a framework for action at smaller scales.[184] For example, Denmark's National Aquatic Environment Plan proved to be a key part of the solution for the cities of Aarhus and Aalborg.[185] In other cases, successful implementation of IWRM at local or basin level influenced national policy, as in the case of Sukhomajri, which provided a model for watershed management, and the Lerma Chapala, which proved to be a pilot case for the concept of Basin Councils.[186] Thus with any basin in any country, it is important to have the various levels of authority and decision-making in agreement with regards to the plan of implementation, and for the decisions by the different levels of authority to complement one another rather than work against each other. It is also important to have a degree of freedom to make decisions at lower levels because these levels of government are more directly involved with on the ground planning and will likely have a better idea of the physical needs of communities.

One lesson emerging from the GWP was to 'keep it simple' because establishing new institutional arrangements on top of existing structures can increase complexity.[187]

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[181] See 176.
[182] See 110.
[183] See 110.
[184] See 110.
[185] See 110.
[186] See 110.
[187] See 110.

Various factors must be considered when building or creating new capacity for water management on top of existing government structures. Decisions must be thought through deliberately and decision makers must be strategic about where to make changes to ensure that those affected by the changes understand and support them.[188] Local, provincial and national levels of government must be able to understand and support changes at any level of government and they must be able to integrate current management and establishment plans with such changes at any of the decision-making levels.

Management of information is of key importance for integrated and adaptive management.[189] Access to information must be open both within and between levels of government, and any uncertainty must be clearly communicated among authorities.[190] CMAs must ensure their documentation is easily accessible to provincial and national authorities, and that information can be shared among CMAs. A lack of shared information among different levels of government could result in unnecessary work, with a risk of repeating mistakes.

Along with ensuring that the hydrologic and administrative boundaries are physically matched, as discussed later, it is important to have division between the different administrative and decision-making levels at which CMAs function. Pahl-Wostl distinguishes the three levels of such a system as follows:[191]

1 The landscape or macro-level with stabilising factors which constitutes the context for a water management regime.[192] The landscape encompasses, for example, environmental variability, legal frameworks, deeply rooted societal norms and cultural values.[193] The landscape provides the context and the selection environment within which a management regime unfolds.[194] The landscape level must not be entirely independent from either the micro or the meso level since feedback processes can operate bottom-up (e.g. diffusion of innovation) and top-down (e.g. selection of regime).[195] In the CMA context, this is the level at which

[188] See 110.
[189] See 50.
[190] See 50.
[191] See 50.
[192] See 50.
[193] See 50.
[194] See 50.
[195] See 50.

social and cultural factors should be taken into account. The type of society each CMA falls within should be considered as a CMA falling in a primarily urban area would have a different implementation plan and establishment process to one falling within an agricultural community.

2 The management regime or meso-level with stabilising interdependencies among the elements as described in the previous section.[196] A regime transition is indicated by changes in the characteristics of regime elements and their linkages.[197] This level is where the various elements of a CMA interact within the bigger picture. All CMA elements must interact with one another to achieve successful communication, which in turn leads to successful establishment and implementation.

3 The niches or the micro-level where innovative approaches can develop in a locally protected environment (e.g. large scale research projects, subsidised pilot studies) and/or in new areas of application such as the restoration of riverine landscapes that have started to become an integral part of water resources management. This level can be used by CMAs as a safe environment in which to develop new ideas and come up with innovative solutions to problems. CMAs must be given autonomy to explore this level because in doing so the CMA might end up with new ideas that could potentially benefit the management of other CMAs. CMAs can be broken down into sub-basin levels – the level at which all elements of a water management regime are at play.[198] At the same time, it is also the level that influences or is influenced by both lower and higher levels of management.[199] The central position of this level allows the CMAs to assess the outcomes of a water management regime at operational level, as management at sub-basin level is influenced by national regulation, while implementing at the operational and local levels.[200]

The implementation of adaptive management, a component of the MTF, requires open and transparent access to information across the different levels of any institution. The process of sharing information includes the following:[201]

[196] See 50.
[197] See 50.
[198] See 114.
[199] See 114.
[200] See 114.
[201] See 50.

1 New information must be available and/or consciously collected (e.g. indicators of performance or change) and monitored over appropriate time scales.

2 The actors in a management system must be able to process information and draw meaningful conclusions. This can be achieved best if the learning process unites actors in all phases of assessment, policy implementation and monitoring.

3 Change must be possible and implemented in ways that are open and understandable to all actors. It must be clear who decides how and when to change management practices, and based on what evidence and why.

When trying to establish management relations across too many variables, a CMA risks becoming mired in complexity at the expense of effectiveness.[202] When putting IWRM into practice, it is important to think strategically about where and to what degree coordination and new management instruments are necessary.[203] What this means is that CMAs must try not to overly complicate the management plans and channels across different levels of government or among decision makers. Establishing clear lines of authority and communication from the start of a CMA project can help solve potential problems the CMAs may have in the future.

Planning processes where central government specifies in detail what plans must look like undermines the notion of local autonomy.[204] Central government must have a facilitating role in CMA processes, but not necessarily a role where the whole CMA establishment and management processes are outlined in an inflexible manner. The newly found independence of local authorities is emphasised in the opening section of Chapter 7 of the Constitution dealing with local government.[205] National government must not 'suffocate' CMA plans by forcing its own agenda, but rather it should give CMAs room to exercise their own decision-making.

The degree to which the delegation or assignment of powers is secure often helps determine the degree of independence that local authorities have in exercising their powers.[206] It also reflects the degree to which governments are serious about creating a domain of local discretionary power, which is a basic element of effective

[202] See 110.
[203] See 110.
[204] See 80.
[205] J Glazewski *Environmental law in South Africa* 2 ed (2005) Cape Town: LexisNexis.
[206] See 80.

decentralisation.[207] If a power is assigned to a CMA, it will have more freedom to execute the power, whereas a delegated power can be revoked if certain conditions are not met. Assigning powers requires more trust between two parties and when assignment takes place, it validates the capacity and efficiency of a CMA and gives staff members confidence in their managing abilities, which potentially creates a friendlier working environment across different levels of government and aids better communication between levels.

Continuous learning is a critical component of adaptive governance in order to be able to take into account complex dynamics and uncertainty within the CMA context.[208] Learning processes are stimulated by networks that enable interaction among individuals, organisations, agencies and institutions at multiple organisational levels to draw upon various knowledge systems and the experience to develop policies.[209] Adaptive governance relies on polycentric institutional arrangements that operate at multiple scales and balance centralised and decentralised control.[210] Furthermore, adaptive governance systems often self-organise because of learning and interaction.[211] However, self-organisation needs to be enabled by flexible institutional arrangements that encourage reflection, innovative responses and some redundancy.[212] Leadership of individuals or organisations may serve as a catalyst for emergent adaptive processes by strategically bringing together people, resources and knowledge.[213] Successful CMA establishment requires cooperation between local, provincial and national governments with a considered balance of power across the three spheres.

Collaboration and communication are crucial for effective management. Several important procedural attributes for effective collaboration have been identified: the presence of shared political tasks, initial agreements, a reliance on self-organisation rather than an externally imposed structure, the use of high-quality, agreement on information sources, proceeding with agreements that have overwhelming support, external legitimacy of the processes, resources and commitment to equalise power

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[207] See 80.
[208] J Rijke, R Brown, C Zevenbergen, R Ashley, M Farrelly, P Morison & S van Herk 'Fit-for-purpose governance: A framework to make adaptive governance operational' (2012) 22 *Environmental Science and Policy* 73–84.
[209] See 208.
[210] See 208.
[211] See 208.
[212] See 208.
[213] See 208.

differences among participants, continuous trust-building activities and genuine engagement in productive dialogue.[214] These attributes of collaboration are applicable both within and among the different levels of CMA stakeholders.

Flawed demarcation of responsibility among actors, inadequate co-ordination mechanisms, jurisdictional gaps or overlaps, and the failure to align responsibilities, authority and capacity for action are major sources of difficulty in implementing IWRM.[215] CMAs need to be intentional about communication within and among different levels of government, as well as among different groups working on the same projects. Implementing IWRM in itself is already a challenge that should not be exacerbated by poor communication.

In the Davao watershed network in the Philippines, the core strategy was constant consultation and identification of areas of common interest rather than conflict among stakeholders, including end users, researchers and land and water managers.[216] The key to sustaining the engagement of competing water sectors was employing science to address water-related issues.[217] When focusing only on conflict, stakeholders tend to forget about the rest of the project they are working on and the focus tilts towards resolving problems instead of building on progress being made in other areas. Problems can be divided among different task teams to solve this. For instance, if the budget of a CMA is a problem, then the financial division would be best suited to solve the problem rather than requesting input from every other division. Clear communication among different task groups is essential. Each CMA needs a holistic response to any scientific and organisational challenges if it is to work successfully with others and implement integrated modelling and decision-making.[218] Poor internal communication is a barrier to reusing policies or plans developed by other groups inside or outside the organisation, which results in a tendency to rely on existing policies, and duplication of effort and resistance to new initiatives.[219] Each CMA should start a collaborative project by reviewing its internal processes to create an enabling environment that will:[220]

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[214] See 45.
[215] See 136.
[216] D Hearne, R Gamboa, & V M Monsanto 'From ideas to action: A review of implementing HELP principles in river basins with limited resources and capacity' (2008) 34(4) *Water SA* 504–511.
[217] See 216.
[218] D N Lerner, V Kumar, A Holzkämper, B W J Surridge & B Harris 'Challenges in developing an integrated catchment management model' (2011) 25(3) *Water and Environment Journal* 345–354.
[219] See 218.
[220] See 218.

- communicate the importance of integrated modelling to upper management and encourage the flow of ideas among different levels of management;
- develop infrastructure that enhances interoperability among information sources, including models and data;
- implement mechanisms that enhance communication, coordination, collaboration and knowledge sharing among stakeholders (i.e. scientists, modellers, risk assessors, decision-makers and affected stakeholders).

To summarise, the main principles related to the policy, information and objective sphere are the following: 1) Various levels of decision-makers should be in agreement on management plans; 2) Decisions must be thought through in a deliberate manner and changes made strategically; 3) Information must be easily shared across levels of government; 4) A clear division between different administrative and decision-making levels is essential; 5) There must be a clear policy specifying the way information must be shared; 6) Central government should play a facilitating role in the CMA establishment process to give CMAs freedom to make decisions; 7) Powers and duties should be assigned to CMAs instead of delegated because it validates the CMA's capacity; 8) Continuous learning should take place among and within CMAs to expand knowledge; 9) CMAs should collaborate with other CMAs or government levels on a regular basis to encourage mutual growth; 10) Common areas of interest must be identified among stakeholders instead of focusing on only the conflicts; and 11) Internal processes must be evaluated to create an environment conducive to effective communication.

3.3 The capacity sphere

A lack of effective governance and management in this sphere stems from insufficient scientific and technical expertise and infrastructure for designing and implementing water policies.[221] Insufficient expertise can apply to local, provincial or national levels of government.

[221] See 176.

Capacity at local level for formal water management planning can be a particularly technical subject with new challenges for which local knowledge may not be suitable.[222] The rapid pace of change and the intricate layering of rules, regulations and sequencing make the rules of the game difficult, and CMAs have to be able to keep up.[223] The rural and poor people in local areas often do not have the time or the human and financial resources to take part in a planning process where the outcome and future benefits appear uncertain.[224] Poor people often lack the knowledge of how to manage resources sustainably and of how to start a process of effective water management, which means that they often lack a voice in the debate or proceedings of water management. Not educating a local community about water management may cause CMAs problems because a community may demand to be a part of the process despite not being able to make a constructive contribution. Giving people the skills to manage water resources is beneficial in the long term and building the knowledge capacity of local communities means communities gain confidence in their ability to manage water successfully.

Successful change processes, in terms of IWRM, should underpin policy change with a sound technical foundation and strong lead institutions.[225] Change should never be imposed for its own sake, although addressing water problems and larger development challenges often requires substantial changes to policies, institutions and practices.[226] Policy change can be a good or a bad thing; often the outcome depends on planning and setting up the foundation for the change to happen beforehand. Without any foundation on which to implement policy change, serious challenges are likely during the change process. Before CMAs make any serious policy changes, they should be confident that such changes are based on sound research, and the fact that policy change happens should be an indication that previous policies are outdated or have been outgrown as time has passed. CMAs must be sure that policy change takes place for the right reasons and that it is not simply a political decision that threatens to undermine all the work put into the current policies.

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[222] P Baumann, R Ramakrishnan, M Dubey, R K Raman & J Farrington. *Institutional Alternatives and Options for Decentralised Natural Resource Management in India*. (2003) London.
[223] See 222.
[224] See 222.
[225] See 110.
[226] See 110.

Before anything else, IWRM is an institutional challenge.[227] It requires institutional capacity to integrate and such capacity is in short supply, and furthermore there may be competition over it.[228] Many countries typically develop integrative capacity at the district level, which is where various government departments such as health, education, agriculture, transport and water participate in implementing multi-sector, rural development programmes.[229] In contrast, the new water architecture emerging in South Africa appears to create a parallel structure, alongside but separate from the existing administrative structures, entirely defined by hydrological boundaries.[230] This may lead to misunderstandings, to competition and even to un-coordinated development, and thus be a waste of valuable institutional resources.[231]

As mentioned above in 3.2, each CMA should start a collaborative project by reviewing its internal processes with the aim of creating an enabling environment. With the focus on capacity building, CMAs should also conduct an internal review and be sure to do the following:[232]

1 Advance more consistent approaches to modelling and analysis across their organisations.
2 Support an enhanced analytical ability to characterise, communicate and understand uncertainties associated with integrated modelling, and the implications of these uncertainties for decision-making.
3 Enable more transparent decision-making supported by new tools and sound scientific analysis.

Central governments are often reluctant to delegate or assign powers before capacity has been demonstrated, yet without powers, there is no basis on which local authorities can gain the experience needed to build capacity or demonstrate that capacity has been gained.[233] This lack of capacity argument often excuses non-delegation of powers.[234] Furthermore, the argument that local populations lack the capacity to use and manage natural resource decisions and to manage local conflicts is

[227] See 134.
[228] See 134.
[229] See 134.
[230] See 134.
[231] See 134.
[232] See 218.
[233] See 80.
[234] See 80.

often baseless.[235] To proceed with decentralisation, the risk of transferring powers before assessing or building capacities must be taken.[236] The reluctance of national government to delegate or assign powers shows a lack of confidence in the governance powers at other levels of government. This lack of confidence must surely be discouraging to the lower levels of government and these lower levels may not feel the need to increase their management capacity if it would not increase the chance of powers being delegated or assigned to them.

The technologies and knowledge required to develop adaptive environmental resource management systems are in most cases available, but their implementation into practical action remains slow.[237] Scholars have identified a range of impeding factors, many of which are related to governance.[238] Recent research also demonstrates that practitioners are willing to embrace new practices but are currently constrained by, among others, traditional servicing arrangements, limited capacity, skills, knowledge of new technologies, and concerns regarding the potential risks to public health and welfare.[239] If these constraints can be resolved, CMAs can start to build the capacity to develop management systems. Particularly relevant to this section is the limited capacity, skills and knowledge. As mentioned, CMAs can gain much by training local communities and equipping them with skills to enable them to be a part of the water management projects.

To deal with existing and new complexities within any water management regime, water resource management must be able to respond to changes in the natural and social environment and to anticipate associated uncertainties.[240] Adaptation to climate change and management of related risks should therefore be built into water resources management plans and programmes.[241] To do this, CMAs must have the relevant technical expertise to deal with the risks associated with water management, for instance floods and droughts. CMAs therefore need a risk management plan, as investing time in developing such a plan means a CMA would be in a position to minimise future damage should floods or droughts occur.

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[235] See 80.
[236] See 80.
[237] See 208.
[238] See 208.
[239] See 208.
[240] See 114.
[241] See 114.

Scientists and other water experts have important roles to play in explaining non-negotiable laws of nature in problem analysis, in analysing what policy changes and legal support might be needed, and also in answering questions arising as part of the process with its many different steps, including stakeholder dialogue, consensus building efforts, policy-making, decision-making, and so on.[242] The role of scientists may sometimes be overlooked because the establishment process is political in nature with predetermined steps and policies to follow. Scientists, however, could have valuable input into any CMA project and therefore should not be overlooked. Because CMAs deal with natural resources that are scientific in nature, scientists who understand natural processes could save other stakeholders time, effort and money from the start by identifying and solving resource problems.

In the past, a 'paradigm lock' has existed between scientists and stakeholders, isolating them from each other: scientists by the lack of proven utility of their findings, and stakeholders by excessive legal and professional regulations, and disaggregated institutions.[243] Initiatives have to encourage the water policy, water resources management and scientific communities to work together so that science can be closely integrated with policy and management needs.[244] This means that if a CMA project has the best scientists to do research, using that research in a practical manner should be easy if scientists and stakeholders work together and idea sharing is encouraged.

Science plays an important role in addressing the world's water problems.[245] Through its objective approach and critical scrutiny of projects and interests, science offers a unique expertise to society.[246] However, the questions asked by society rarely correspond with those asked within the scientific community, leaving considerable potential for mismatched solutions.[247] While asking questions and being inquisitive about new policies and ideas is a good thing and can lead to innovation, it is important that scientists stick to their current task with the end goal in mind to minimise the potential for mismatched solutions.

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[242] M Falkenmark 'Towards integrated catchment management: opening the paradigm locks between hydrology, ecology and policy-making' (2004) 20(3) *International Journal of Water Resources Development* 275–282.
[243] See 242.
[244] See 242.
[245] M Falkenmark, L Gottschalk, J Lundqvist & P Wouters 'Towards integrated catchment management: increasing the dialogue between scientists, policy-makers and stakeholders' (2004) 20(3) *International Journal of Water Resources Development* 279–309.
[246] See 245.
[247] See 245.

While traditionally engineers and hydrologists have played central roles in securing adequate water for societal needs, it is clear that the expert understanding of economists, lawyers, and political and social scientists in the sector is equally important. Their input is needed to identify the necessary policies and processes to facilitate and support political decisions determining 'who gets what' when competing needs arise for limited water resources.[248]

To summarise, the main principles related to the capacity sphere are as follows: 1) Skills should be taught to local communities to empower them to manage water resources; 2) A strong technical foundation and effective institutions should be the core of any successful change process; 3) Institutional capacity must be developed at the district level; 4) CMAs should advance more consistent approaches to modelling and analysis across their organisations; 5) CMAs should develop an analytical ability to characterise, communicate and understand uncertainties associated with integrated modelling; 6) CMAs should enable more transparent decision-making supported by new tools and sound scientific analysis; 7) Government should consider delegating powers to CMAs early in the establishment process to test their capacity; 8) The technologies available to develop adaptive systems must be put into action; 9) CMAs must have the technical expertise to be able to deal with the risks associated with water management; and 10) The role of scientists should not be overlooked in the CMA establishment.

3.4 Funding or financial sphere

Governance and management problems in this sphere arise from insufficient or unstable revenues to implement water policies across ministries and levels of government.[249] A big part of establishing a CMA is that sufficient financial resources must be available as it requires capital to draw up a business plan proposal, to set up offices for CMA staff, and to invest time and money in research, to name a few. The NWA stipulates that CMAs may only be funded in specific ways, and the channels of funding can have an impact on how fast a CMA is established, and thereafter, becomes operational.

[248] See 245.
[249] See 196.

The large infrastructure required to establish a CMA can result in enormous sunk costs.[250] For example, in the CMA context, money spent on unnecessary infrastructure development cannot be recovered. The flexibility of economic systems is compromised because of financial loss due to such sunk costs.[251] The water price in urban areas may, for example, be largely independent of water use but rather may reflect the costs of prior investment in water supply and wastewater treatment infrastructure.[252] Adaptive and integrated water management requires diversification of financial resources using a broad set of private and public financial instruments.[253] Risks have often been managed by prescribing technical standards such as regulations for the required size of flood protection systems based on the likelihood of an extreme flooding event.[254] Due to increased uncertainty relating to climate change, the conditions under which such regulations were passed may no longer be fulfilled.[255] Acceptable risks need to be negotiated via participatory processes rather than being prescribed by law.[256] The financial structure of a CMA should be one of the starting points in the establishment process. Having a well-structured financial plan is important because it determines the budgetary needs for each CMA division and prevents overspending in some areas that could hold back progress in other areas. Managing financial risk should be a CMA priority to prevent wasting money on expenses that will not contribute to the overall project or process.

In India, the enormous transaction costs associated with the agenda for decentralised resource management are a major explanatory factor for slow progress.[257] In the CMA context, there can be various explanations for slow progress, where a lack of costs could be but one of the factors. As mentioned above, a budget is important for a CMA with a well-structured budget being able to avoid financial problems due to unforeseen expenses or unexpected transaction costs. The process of creating a budget must be included in each CMA's business plan as required by Section 23 of Schedule 4 of the NWA. Section 24 of Schedule 4 lists the matters CMAs must consider when setting financial targets; adhering to these guidelines can benefit CMAs

[250] See 50.
[251] See 50.
[252] See 50.
[253] See 50.
[254] See 50.
[255] See 50.
[256] See 50.
[257] See 222.

immensely because it reduces the risk of a CMA leaving out important aspects of its financial planning. Another important factor is that the CMA board must ensure retention of all its financial records and that records are kept up to date as they may be subject to investigation by the Minister.[258]

Natural resources are revenue generating unlike other important public services such as infrastructure, health and education, hence they can provide revenues needed to make local governments more independent, and they can give governments allocative powers over lucrative opportunities, both of which can help build local government legitimacy.[259] As CMAs become more independent from national government, they can take on more financial responsibility and it will be easier to allocate funds to specific parts of a project without intervention from central government. One such responsibility is the setting and collecting of water use tariffs, which is not a power delegated or assigned to a CMA from the start.

One of the common challenges with funding relates to the capture and reinvestment of natural resource management revenues generated through natural resources management.[260] Some studies found that despite the significant amounts of revenue collected at local government level, with even greater revenue potential, little finds its way back into promoting and sustaining long-term natural resource management.[261] In addition, it is nearly impossible to establish whether the revenues collected come from sustainable or unsustainable natural resource exploitation.[262] If natural resource revenue flows are to be mobilised and sustained, mechanisms and incentive structures are required at local, provincial and national levels.[263] This challenge will prove difficult for CMAs for now as they are not yet operational, and thus there is no revenue to invest in further development. Once a CMA becomes functional and independent, it can explore various plans to ensure that some revenue collected from water management is reinvested in long-term sustainable practices.

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[258] The provisions for records and reporting of financial matters can be found in Section 32 of Schedule 4 of the NWA.
[259] See 80.
[260] Development Partners Group Tanzania *Decentralised Natural Resources Management: Towards a shared vision and common strategy* (2014).
[261] See 260.
[262] See 206.
[263] See 260.

Returns on investment in water frequently revert as wide-ranging and often long-term financial benefits spread across different segments of the economy.[264] In South Africa, IWRM was found to encourage greater private investment in water infrastructure.[265] Good financial investments based on sound research lead to increased returns on the investment in the future. CMAs must aim to increase their funding annually and to make investing attractive to private entities or individuals to boost their financial resources.

Participation in CMA steering and forum groups is often voluntary with no participant compensation. Without financial compensation for being part of such groups, enthusiasm is seldom high. In the Philippines, status rewards rather than financial compensation are seen as important drivers sustaining participation.[266] They found that the status gained from being involved in important projects was an important stimulus for participation from the outset.[267] This is important for CMAs to keep in mind; making participants feel important and making them realise that their input matters can be just as rewarding as financial compensation. CMAs may pay any of their board members from the revenues of the institution,[268] but any other groups or members of a CMA are without remuneration unless otherwise stated by the specific CMA.

To summarise, the main principles related to the funding sphere are as follows: 1) Adaptive management and IWRM require a diversification of financial resources using a broad set of private and public financial instruments; 2) The managing board of a CMA must ensure that its financial records are retained and up to date; 3) The process of creating a budget must be included in each CMA's business plan; 4) CMAs should aim to become financially independent from government; 5) CMAs should explore various plans to ensure that some of their revenue is reinvested in long-term sustainable water management practices; 6) CMAs must aim to increase their funding annually and to make investing attractive to private entities or individuals; and 7) CMAs should motivate stakeholders to take part voluntarily in CMA activities.

[264] See 110.
[265] See 110.
[266] See 216.
[267] See 216.
[268] Section 2(2) of Schedule 4 of the NWA.

3.5 Accountability sphere

A lack of accountability within a water management institution refers to a lack of transparency, institutional quality and integrity in water policy making, and an overall lack of responsibility and accountability from either the implementing authority or the delegating authority.[269]

One cannot expect design and implementation of integrated and adaptive management regimes to be based on a full understanding of the interaction between regime elements because some regime properties are emergent, unpredictable and path dependent, and only unfold during the implementation process.[270] Hence the whole process of change, the transition towards integrated and adaptive management regimes also has to be regarded as a kind of adaptive management process, which is why accountability and transparency are crucial at each stage of the CMA establishment process.[271] Keeping in mind the relationship between different elements of the CMA's establishment, as well as the end goal, requires planning and transparency among the people involved in the project to ensure the process is successful and that time management is effective. Furthermore, each element of the project should be flexible enough to handle changes during the process.

A comprehensive understanding of water problems and their solutions is only achieved through open, shared information sources that fill gaps and facilitate integration.[272] If information is not shared across different levels of government or even among staff within a CMA, it could be difficult to determine the stage the project is at and how to continue. Open information sources could also encourage the formation of new ideas if people are willing to encourage one another to develop their ideas.

Whether the transfer of natural resource powers within or into the local institutional landscape will promote or undermine representative, accountable and equitable processes depends strongly on which local actors are entrusted with discretionary powers over natural resources.[273] The people entrusted with responsibilities throughout the CMA establishment process should be able to handle problems confidently; in

[269] See 176.
[270] See 50.
[271] See 50.
[272] See 50.
[273] See 80.

addition to which, they should have the knowledge to facilitate and initiate the implementation process. If the management of resources is allocated to non-democratic or ill-equipped institutions, then the environmental benefits derived from decentralisation are likely to be less either for all people or for specific groups of people.[274] Some ex-colonial states in Sub-Saharan Africa, for example, used the allocation of land control to legitimise and strengthen customary authorities who served as their local agents for the purpose of controlling and managing local people.[275] When powers are transferred to CMAs, it must be done equitably and within CMA capacity. The local actors within a CMA to whom powers are transferred must have integrity and be responsible to see the project through.

Empowering authorities that are not held downwardly accountable to local populations can undermine the long-term environmental well-being expected from more accountable local management.[276] Taking resources away from emerging democratic structures can jeopardise democracy, while strengthening and helping entrench the non-democratic institutions that democratic reforms aim to replace.[277] Mechanisms must be in place whereby national government can give feedback and be held accountable to lower levels of government. Local and provincial governments must have access to politicians and they must have input into new policies and plans, which will help the voice of those most affected by poor water management to be heard and their needs to be considered.

Large-scale infrastructure, especially the kind that is developed over long periods under different political regimes, provides few opportunities for learning due to its ever-changing nature.[278] Adaptive management is mainly linked to the operational level.[279] More diverse sources of design adapted to regional contexts and an increased use of decentralised technologies have been promoted as promising strategies for achieving sustainable and integrated water management.[280] One of the problems CMAs face is that political leaders are elected for a term of 4 years, after which the politician has no further input into the project. Every 4 years therefore politicians may choose to change

[274] See 80.
[275] See 80.
[276] See 80.
[277] See 80.
[278] See 50.
[279] See 50.
[280] See 50.

policies or laws, and this makes it difficult for CMAs to have consistency in their plans to implement, establish and operate CMAs. Furthermore, every 4 years, new politicians are held accountable for the successes or failures of CMAs without their having been involved prior to their election. One possible solution would be to reduce political interference in the establishment process and to allow non-political stakeholders a more prominent role in the process.

Integrated planning and management is only possible when individuals and organisations come together and commit to sharing and implementing ideas.[281] Organisations can be the greatest facilitator of these interactions or their greatest barrier.[282] The willingness and ability of people within an organisation to collaborate can be impeded by a number of human and institutional factors.[283] The first and often main challenge is whether individuals and organisations commit to the overall concept of collaboration as a means of agreeing objectives and seeking mutually satisfactory solutions.[284] These problems are multiplied when several organisations are involved, as may be the case for CMAs.[285] A lack of integrity and transparency within and among CMAs can be a major hurdle to development, and one that can be difficult to solve without stakeholder agreement to put aside differences and compromise on certain aspects to move forward with CMA establishment.

Recognising that process change is often slow and restructuring of institutional arrangements is a continuous process, strong leadership is required to ensure that the focus remains on the positive elements of a project and to provide vision in balancing decisions as a range of competing interests come into focus.[286] The role of local facilitators therefore is critical in providing continued stimulus to keep actions focused on real issues.[287] It is thus important to have leadership with good managerial skills and these leaders must be comfortable managing large groups of people. Having people in charge who ensure that good quality standards are upheld in every part of the CMA establishment process will allow the process to evolve more efficiently.

[281] See 218.
[282] See 218.
[283] See 218.
[284] See 218.
[285] See 218.
[286] See 216.
[287] See 216.

Given that CMAs are created by law and use public resources to carry out their duties, it is important that they operate within the parameters of legislation.[288] This means that CMAs must continually refer to the law to ensure they are operating within the rules set out in the various applicable laws. It is the CMA stakeholders' responsibility to check compliance.

To summarise, the main principles related to the accountability sphere are as follows: 1) Open and shared information sources that fill gaps and facilitate integration must be developed; 2) Stakeholders should have the knowledge to facilitate and initiate the implementation process; 3) Powers should be transferred within a CMA's capacity; 4) Accountability and transparency are crucial at each stage of the CMA establishment process; 5) Mechanisms must be in place whereby national government can give feedback and be held accountable to lower levels of government; 6) Local and provincial governments must have access to politicians and they must have input into new policies and plans; 7) There must be agreement between stakeholders to compromise on certain aspects to move forward with CMA establishment; 8) Strong leadership is required to ensure the focus remains on the positive elements of a project; and 9) CMAs must operate within the parameters of legislation.

3.6 Administrative sphere

Administrative mismanagement occurs where a mismatch occurs between hydrological and administrative boundaries of water management institutions that might give way to resource and supply gaps.[289] South Africa was originally divided into 19 CMAs, but on 30 March 2012, it was announced that it would be reduced to nine CMAs.[290] This decision was made for a number of reasons, including the technical capacity required to staff CMAs, and the challenges such a large number of institutions poses to the DWAS in regulating their performance.[291] According to the minister of Water and Environmental Affairs, Ms Edna Molewa, the nine new CMAs will play a critical role in managing the country's scarce water resources.[292] The new CMAs will

[288] See 86.
[289] See 176.
[290] Department of Water Affairs 'Minister establishes nine (9) catchment management agencies' 30 March 2012 Available: https://www.dwa.gov.za/Communications/PressReleases/2012/Media release Catchment Management Agencies March 30 2012.pdf.
[291] See 290.
[292] See 290.

operate within the broader framework provided by the Minister of Water Affairs (Minister) and the national water resource strategy.[293] Downscaling from 19 to nine CMAs means that staff and offices had to be moved, which could be a very slow process and which could put the establishment process on hold. Although the move from 19 to nine CMAs helped match up hydrological with administrative boundaries, some CMA staff members may not yet have moved to the newly assigned CMAs.

Water resource planning and management must be linked to a country's public administration framework.[294] While the river basin is an important and useful spatial scale at which to manage water, in some cases it may be appropriate to work at smaller sub-basin scale or at a regional multi-basin level.[295] This could be beneficial for some of the larger scale CMAs. In some instances, it would make sense to have small satellite offices at locations far from the main CMA office. The stakeholders engaged in the establishment process might not be physically able to be in one place at any given time. Smaller working units within a CMA would also make sense because there are several divisions within a CMA, such as the financial division, the technical division and the physical infrastructure development division, which all collaborate on one project.

Decentralised natural resource management, even from a conservative perspective, involves significant change and institutional transformation.[296] At the very least, after decades of centrally planned development, decentralisation involves new partnerships and changing attitudes.[297] However, more significantly, it also involves a changing rights structure; not so much over the natural resources themselves, over which the state retains the ultimate property right, but over the institutional structure through which natural resources are managed and funds for natural resource management are allocated.[298] The consequences of a transition to a decentralised system of natural resource management differ for established groups.[299] A change in the structure of rights over natural resources is likely to be resisted by those who will lose access to a benefit stream either directly or indirectly.[300]

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[293] See 6.
[294] See 110.
[295] See 110.
[296] See 222.
[297] See 222.
[298] See 222.
[299] See 222.
[300] See 222.

Successful environmental decentralisation programmes must take advantage of, support and work with democratic reforms.[301] The successful democratic reforms will benefit from careful institutional choices within the natural resources sector.[302] Throughout South Africa's history, its institutional arrangements governing the water sector have been shaped largely by natural events such as droughts and political events.[303] The reform initiated since 1994 has acquired an entirely new dimension, not just because of its intensity and its depth, but also because it is part of a countrywide reform programme for social, economic and political reconstruction.[304] The announcement that 19 CMAs would be reduced to nine was widely welcomed by the water sector and hailed as evidence of the Department's commitment to ensuring the full implementation of the NWA and to maintaining the sustainable use of the nation's water resources in line with the national development imperatives of government.[305] Reform in the water sector since 1994 has aided in the reconciliation of physical catchment boundaries to administrative boundaries for managing CMAs.

According to the GWP, water resource planning and management must be linked to a country's overall sustainable development strategy and public administration framework.[306] Water management will not be successful if it is set up as a stand-alone system of governance separate from other structures of public administration.[307] When setting out plans to establish CMAs, the current structure of the country's public administration framework must be consulted to see how CMAs fit into the picture. Capacity is needed within the framework to accommodate CMAs and this capacity must be developed continuously as more CMAs are established and become operational. The GWP also states that while the river basin is an important and useful spatial scale at which to manage water, in many cases it may be appropriate to work at a smaller sub-basin scale. From an administrative viewpoint, this makes sense for CMAs as it is easier to manage administrative matters within smaller units.

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[301] See 80.
[302] See 4.
[303] See 4.
[304] See 4.
[305] See 290.
[306] See 110.
[307] See 110.

Integrated catchment management often falls short of the ideal it sets out to achieve.[308] One of the ways to address the implementation gap is to develop tools that enable decision makers to think in different ways and to ultimately come to more integrated decisions.[309] These decision support tools can underpin communication and learning within a group by providing the best available evidence base for comparing the impacts of different management options on multiple objectives and stakeholder interests.[310] One important requirement of such tools is that they must be easily transferable to new regions.[311] CMAs should not try to develop these tools individually, but should rather try to focus on a set of tools that could easily transcend physical and administrative boundaries between CMAs. CMAs can learn from one another in this way and CMAs might be able to offer one another advice on the best possible management strategies based on their own experience.

Clarifying which organisations are responsible for monitoring what, and identifying a single coordinating body where data can be centrally collected, managed and shared is a critical element of implementing IWRM.[312] This clarification is critical to sustain any move away from sectoral management.[313] It also will help identify where private stakeholders, NGOs and communities can best assist the mandated agencies, and better support the continued shift from conflict to collaboration among sectors.[314] Having complete division between and clarity on the roles of every division of a CMA will avoid confusion and help avoid duplication of tasks. The Davao River Basin Network in the Philippines identified a private non-profit organisation to fulfil the role of coordinating body to the network of river basins. They found that civil non-profit organisations were often less restricted and better positioned to attract external funds.[315] Once such an organisation has a formal agreement for sharing data with local government bodies, it becomes the coordination point and data manager for IWRM.[316]

To summarise, the main principles related to the administrative sphere are as follows: 1) Water resource planning and management must be linked to a country's

[308] See 218.
[309] See 218.
[310] See 218.
[311] See 218.
[312] See 216.
[313] See 216.
[314] See 216.
[315] See 216.
[316] See 216.

public administration framework; 2) Smaller units within a CMA make sense because efficient water management has several components; 3) Successful decentralisation must work with democratic reforms; 4) Decentralisation often involves a change in the institutional structure through which natural resources are managed; 5) Water resource planning must be linked to a country's overall sustainable development strategy and public administration framework; 6) Tools must be developed that enable decision makers to think in different ways and to come ultimately to more integrated decisions; 7) It would be beneficial for CMAs to have a single coordinating body where data can be centrally collected, managed and shared; and 8) Having complete division between and clarity on the roles of every division of a CMA will avoid confusion.

3.7 Conclusion

This chapter showed that a wide range of principles contribute to successful water governance and management at catchment level. Three of the most widely used governance and management models in modern water management regimes were chosen to demonstrate some of these principles. The following chapter examines the NWA as it relates to CMAs, and investigates the specific provisions in the act that hinder CMAs from implementing or adhering to the principles set out in this chapter to effectively implement decentralisation, the MTF and IWRM.

CHAPTER 4 THE NATIONAL WATER ACT: CATCHMENT MANAGEMENT AGENCIES

4.1 Introduction

Decentralising powers and functions to lower levels of government has become common in the developing world, and local governments are increasingly required to play a larger role in providing services, alleviating poverty and facilitating development.[317] Given the important role local governments are being called upon to play, central governments and development organisations are starting to ask how well they are doing and how their management and development can be improved.[318] The problem with asking such questions is that criteria for evaluating local governments in developing countries remain poorly formed: What does a 'good' local government look like in the developing world? What factors should one consider when evaluating local governments in such settings?[319] The criteria for and assessment of good governance should consider aspects specific to the institution in question, the industry it operates in and the wider environment.[320] In the United States, for example, conformance to legal and other processes and fiscal health are important criteria for evaluating government performance.[321] In Germany, monitoring board effectiveness has been recognised as a component of good governance for many years within listed entities, as well as within publicly owned or family-run operations.[322] In other words, criteria for measuring good governance and management differ from country to country and industry to industry, with no one set of criteria by which to measure CMA performance.

Grimble and Wellard describe the need for stakeholder analysis or assessment in natural resource management problems.[323] They state that due to the generic importance of natural resource management, third parties are inherently embedded in these problems, and stakeholder analysis helps identify these third parties.[324] In the context of CMAs, these third parties could refer to, among others, agricultural farmers, the average household of water users or industries using large amounts of water in their

[317] See 86.
[318] See 86.
[319] See 86.
[320] D Mattheus 'Evaluation Is Key To Good Governance' (2014) Winter 2014 ed:3 *Ethical Boardroom*.
[321] See 86.
[322] See 320.
[323] See 97.
[324] See 97.

product development cycle. Failure to include essential stakeholders in the decision-making process regarding problems can lead to sub-optimal solutions that experience strong opposition.[325] Stakeholder analysis may be a key tool for assessing the performance of water institutions and IWRM, and the effects of these management practices due to one important notion that distinguishes this approach from other assessment methods.[326] This notion lies in the question posed earlier: 'What can be considered good governance?'[327] Whereas some other approaches assess 'good' in terms of good organisational performance (throughput), or how well IWRM fits the principles as stated in international conventions (input), a stakeholder analysis approach assumes that what is 'good' governance of water resources is purely in the eye of the beholder, based on the output of institutions in place, in this case CMAs.[328] In other words, only water users and those affected by its management practices can assess if the management process is 'good' or not, that is, if it meets their objectives or not.[329]

Stakeholder analysis is a methodology used to facilitate institutional and policy reform processes by accounting for and often incorporating the needs of those who have a 'stake' or an interest in the reforms under consideration.[330] With information on stakeholders, their interests and their capacity to oppose reform, reform advocates can choose how to best accommodate them, thus assuring policies adopted are politically realistic and sustainable.[331] The above perspective will be followed in this chapter by observing the role of a stakeholder on the outcome of water management by CMAs. The previous chapter set out various principles of good governance and management in the context of IWRM, the MTF and decentralisation to come up with criteria by which to measure effective water management at catchment level. All the principles in the previous chapter are considered to aid successful water management; those principles will be tested in this chapter. The sections of the NWA relating to CMAs will be examined by reviewing the different sections and provisions where potential problems can be identified which will hinder the ability of CMAs to adopt the principles explored in chapter 3. The remainder of the chapter is divided into smaller sections to assess

[325] See 97.
[326] See 97.
[327] See 97.
[328] See 97.
[329] See 97.
[330] World Bank 'What is stakeholder analysis?' availableat *http://www1.worldbank.org/publicsector/anticorrupt/PoliticalEconomy/PDFVersion.pdf,* accessed on 20 August 2015.
[331] See 330.

various aspects of the NWA as they relate to water management in the CMA environment. It is hoped that the potential governance and management challenges or problems identified in this chapter can be overcome by using some of the principles of good and effective governance and management identified in the previous chapter. The potential challenges and problems are addressed by suggesting solutions based on the principles from the previous chapter.

4.2 The establishment process of a catchment management agency

The introduction of Part 1 of Chapter 7 states that a CMA may be established on the initiative of the community and stakeholders concerned. When there is no initiative from the community or stakeholders, then the Minister must establish a CMA for a specific water management area. One of the principles identified in section 3.4 is that CMAs should motivate stakeholders to take part voluntarily in CMA activities. Voluntary involvement of community members is beneficial for a CMA because such members can often identify areas in which water management needs improvement because they rely on daily water supply. Currently, CMAs do not offer incentives for voluntary participation and one of the ways to encourage participation is to inform and educate communities on the importance of efficient water management which could persuade individuals to show concern and participate in the process. Another relevant principle, identified in section 3.2, claims that common areas of interest must be identified among stakeholders rather than focusing on the conflicts. The common goal for all stakeholders is the efficient and equitable management of water and this goal should be the focus of meetings and policy development processes, instead of a focus on the self-serving individual interests of stakeholders. Before the establishment of a CMA, a proposal must be submitted to the Minister to determine whether the establishment process can be started. The required contents of the proposal are listed in Section 77 of the NWA.

A proposal to establish a CMA must include information on how the proposed CMA will be funded. As explained earlier, the establishment of CMAs may only be funded with resources appropriated by Parliament or money obtained from any other lawful source.[332] Before establishment, the proposed CMA cannot indicate that it will fund its operation by water use charges because the collection of water use charges are a delegated function and is only implemented once a CMA becomes operational and

[332] Section 77(1)(d) of the NWA.

starts supplying water to its users. The feasibility of the proposed CMA in respect of technical, financial and administrative matters must also be included in the proposal,[333] which might prove challenging if a CMA has not yet been established because its potential capacity can only be assessed once functions are delegated to it. Determining potential capacity is difficult and can only be done to a certain extent. For instance, a CMA can estimate how many staff members it would require to deal with the technical, financial and administrative matters, but at best it will be an estimate. Measuring infrastructure is also challenging because it is almost guaranteed that the CMA's existing infrastructure will change once it becomes operational. A principle identified in section 3.2 is that continuous learning and collaboration should take place among CMAs to encourage mutual growth and expand knowledge. This principle could prove useful in the above challenge because the not yet established CMAs could learn valuable lessons from the two already established CMAs, allowing the CMAs in the process of establishment to implement strategies that proved useful to the successful establishment of those two CMAs.

Before the Minister can establish a CMA, he or she must publish a notice in the Gazette inviting written comments from the public, which must be taken into account prior to establishment.[334] Section 78(3)(a)(i) requires the notice in the Gazette to set out the proposed establishment of the CMA, the proposed name and the proposed water management area. It does not require that the notice include the catchment management strategy or any other strategies, objectives, plans, guidelines and procedures of the CMA for the protection, use, development, conservation, management and control of water resources within its management area. By including only the proposed name and water management area in the Gazette, crucial information informing the public on how the CMA will function is missing. This is not likely to be well-received by interested stakeholders concerned with the day-to-day operations of the CMA. This section should therefore be amended to include all information that interested parties may deem necessary to be included in the Gazette. One of the relevant principles that emerged in section 3.2 was that a clear policy must specify the way information must be shared among and within institutions. Typically, this would refer to the sharing of information among and within CMAs and government levels, but it could just as easily apply to the sharing of information between CMAs and citizens.

[333] Section 77(1)(e) of the NWA.
[334] Section 78(3) of the NWA.

Because a supply of adequate water is a basic constitutional right, it seems fair to say that individuals have the right to know a CMA's proposed strategies, objectives, plans, guidelines and procedures and how efficient and equitable water management is to be achieved. This section should be amended to include all relevant information required for citizens to have peace of mind that the proposed CMA will be managed successfully.

4.3 Catchment management strategies (CMSs)

Part 2 of Chapter 2 of the NWA deals with catchment management strategies. CMAs are not required to develop a full CMS in relation to the water resources within its water management area up front, but only progressively. This statement in the NWA introduces the first problem. When a CMS is developed in a progressive manner, it means that it is continuous and happening gradually or in stages,[335] with no indication of a timeframe or an end. This is a major problem for CMAs because they must give effect to their CMS when exercising any power or performing any duty in terms of the NWA.[336] Not having a fully developed CMS is therefore detrimental to the operation of a CMA because the CMS sets out the strategies, objectives, plans, guidelines and procedures of the catchment management agency for the protection, use, development, conservation, management and control of water resources within its management area.[337] A fully developed CMS will help CMAs get their plans and procedures in place to expand capacity and become fully responsible legal entities capable of being assigned duties relating to water management within their water management area by the Minister. One of the principles identified in section 3.6 is that water resource planning must be linked to a country's overall sustainable development strategy. It can be assumed that any sustainable development strategy would involve the environmental sphere of management and development. This principle is given effect in Part 2 of Section 2 of the NWA because the CMSs developed by CMAs must be in harmony with the National Water Resource Strategy (NWRS), whose vision is to achieve sustainable, equitable and secure water for a better life and environment for all. If the NWRS aims to achieve sustainable water use and development, it would follow that aligning a CMS with the NWRS would result in sustainable water use and development.

[335] Section 8(3)(a) of the NWA.
[336] Section 11 of the NWA.
[337] Section 9(c) of the NWA.

Even before establishing a CMS, a CMA must invite the written comments of all public members which they must consider.[338] This action can result in a lengthy process and further delay in CMA establishment. Carriger claims that participation processes can stall processes, undermine development and impose heavy costs on participants if they are undertaken without clear objectives, timelines, informed stakeholders and mechanisms for negotiation and conflict resolution.[339] One way to avoid this would be for groups of experts to be involved in setting up the preliminary CMSs. Involving people with practical, theoretical and legal knowledge will likely result in a more effective and relevant CMS than if only one group of people (namely the CMA employees) is involved in its establishment. One of the principles discussed in section 3.3 was that the role of scientists should not be overlooked in the CMA establishment process. Science plays a unique role in addressing the world's water problems,[340] and CMAs should take advantage of the expertise that scientists could add to addressing challenges. Part 2 of Chapter 7 of the NWA requires that the board of a CMA be constituted so as to provide the necessary expertise to operate effectively. This could refer to the necessary scientific expertise, which would ensure that this principle is given effect.

Ideally, decision-making processes in decentralised bodies integrate people's needs and interests via, among others, the election of a council, chief administrators and managers; participation in specific sectoral fields; the elected council as people's representation at local level; and the inclusion of third-sector organisations and local enterprises.[341] For participatory processes to be effective, stakeholders need to be brought in at the appropriate stage and their participation needs to be grounded in a well-defined and acceptable structure.[342] By first involving groups of experts rather than the public, a CMA can be sure that it will likely cover all the concerns citizens or communities will have without having to go through lengthy public processes to achieve the same result. After involving experts in the field and drafting a CMS, the CMS can be made public for comments. Receiving feedback from the public at this stage may prove more beneficial than involving the public from the start because feedback at this point is more likely to be relevant and useful for improving the first draft of the CMS. CMAs must see that their CMSs are accessible to all members of a community to submit comments

[338] Section 8(5)(a)(iii) of the NWA.
[339] See 110.
[340] See 245.
[341] See 7.
[342] See 110.

thereafter and that all community members feel included in the CMS preparation process as required by NWA Section 10(2)(c)(ii).

The rural and poor people in local areas often do not have the time, or the human and financial resources to take part in a planning process where the outcome and future benefits are uncertain for them, as mentioned in section 3.3.[343] One of the principles emerging from the same section was that skills should be taught to local communities to empower them to manage water resources. It is plausible that if local communities gain knowledge of water management, they are more likely to participate in the public comment processes provided for in the NWA. Currently no provision in the NWA requires any training or teaching to be supplied to local communities or individuals with regard to water management, yet it is a real possibility that it could benefit CMAs should they decide to provide training in the future.

4.4 The governing board of a catchment management agency

Mattheus states that a critical view of a board's work should sit at the heart of a company's approach to governance.[344] Sections 81–83 deal with a CMA's governing board, which holds a huge amount of power regarding decision-making. Having an effective and dedicated governing board therefore can make a big difference to how successfully and efficiently CMAs are managed.

A CMA's board must be set up to represent and reflect the interests of all stakeholders in a balanced manner.[345] Members may be elected or nominated by water user groups, or by the Minister for appointment by the Minister. Appointing board members must be done with the objective of achieving balance among the interests of water users, potential water users, local and provincial government and environmental interest groups.[346] Before appointing board members, the Minister must establish an advisory committee to recommend which organs of state and bodies should be represented on the governing board, and the number of persons they should be allowed to nominate. Only after the Minister has received the recommendations may members be nominated for the governing board. Thereafter the Minister may appoint the nominated members. Although it is a lengthy process to appoint the members of a CMA

[343] See 222.
[344] See 320.
[345] Introduction to Part 2 of Chapter 7 of the NWA.
[346] Section 81(1) of the NWA.

governing board, it ensures a fair nomination and election process, which relieves the Minister from having to take full responsibility for choosing a governing board; it also opens up the process to helpful input from other reliable sources. A principle identified in section 3.5 is that strong leadership is required within an organisation to ensure the focus remains on the positive elements of a project to encourage positive development. CMA board members should be able to motivate CMA staff to perform better, and board members must show enthusiasm for new strategies and policies. CMA establishment and institutional changes put pressure on financial and administrative systems and can cause employees to lose hope in the process and become demotivated. The appointment of dynamic board members can boost staff performance by keeping them motivated.

Section 81(14), which claims that a member nominated for appointment to the board of a CMA by any organ of state is accountable to that organ of state or body, contains a provision that limits the responsibility of the Minister. Although this provision might appear to promote the division of tasks and promote cooperation between different organs of state or bodies, the opposite could in fact be true. Holding different board members responsible to different bodies may cause incoherence among the CMA board, with board members showing loyalty to several organisations instead of one. The Minister has the ultimate authority in appointing board members so it is logical to assume that board members should be accountable to the Minister and not to another person or authority. One of the principles from section 3.2 states that decision-makers need to be in agreement regarding management plans. This principle can be undermined by the above provision because individual board members are accountable to various institutions, each of which could have a different opinion on how water management should be approached. To give effect to this principle, all board members should be held accountable to the Minister, which might strengthen agreement between board members working towards a common goal.

Section 82(5) claims that a CMA may establish committees, including an executive committee, and consultative bodies to perform any of its functions within a particular area or to advise it generally, but the CMA must determine how they should function. This section should be read in conjunction with section 86 which claims a CMA may not delegate the power of delegation or delegate the power to set water use charges, and with Section 19 of Schedule 4, which explores the provisions relating to appointing

committees. Section 86 further prescribes the powers or duties a CMA may or may not delegate, but does not prescribe how and to whom specifically they must be delegated. In setting up a committee or consultative body, the CMA must follow NWA rules. The committee or body it establishes is accountable to the CMA and must adhere to all relevant NWA provisions, including those in Schedules 3 and 4. Establishing committees could give effect to a principle from section 3.2: Institutions must have the technical expertise to deal with the risks associated with water management. A risk management committee could increase a CMA's ability to respond to unforeseen events. Risk management could be of a financial, administrative or resource nature and could provide CMAs with insight into management options the CMA would not necessarily have been able to identify without such a committee. This provision in Section 82 must be followed with care, however, because in establishing such committees or bodies, the CMA is potentially creating a number of units that may quickly become disconnected during the process of performing their duties as separate units. It is important for each unit to function effectively within the bigger picture, with the CMAs and such committees or bodies agreeing to determine the responsibilities of each committee, as well as how their functions and duties relate back to the CMA's overall operation.

4.5 The financial resources of a catchment management agency

The NWA does not deal entirely with the financial resources of a CMA because some of the provisions are found in other legislation.[347] Chapter 5 and Section 84 of Chapter 7 of the NWA deal with the measures to finance the provision of water resource management services, and the financial and economic measures to support the implementation of strategies aimed at water resource protection, conservation of water and the beneficial use of water. Sections 61 and 62 of the NWA deal with financial assistance the Minister may grant to CMAs, while Sections 56 and 57 provide for a pricing strategy for water use charges as well as the application of the pricing strategy. Section 84 deals with the funding of CMAs and Section 23 of Schedule 4 prescribes the financial matters a CMA must include in its business plan.

The Minister sets the water pricing strategy, which gives guidelines to water management institutions; CMAs are then free to use those guidelines to determine and

[347] See The Public Finance Management Act 1 of 1999.

collect water tariffs (once that function has been delegated to the CMA). The Minister, however, may only set such a pricing strategy after public consultation. Different water use charges may be set for specific areas depending on a number of factors, including the type of individual water users in an area. Involving the public's opinions in establishing the pricing strategy can prove time consuming with no guarantee of consensus when all individuals' opinions could have an influence. From a practical perspective, involving public opinion is not viable. Whether people are poor or whether they have enough money to pay for water becomes irrelevant when involving the public because the author believes that people will always argue to pay as little as possible when the opportunity presents itself, regardless of what they can afford. Because of the inclusion of water as a basic right in the Constitution,[348] it is easy for individuals to argue that they should not pay for water usage. A more suitable option would be to base the pricing strategy on sound social and economic research. As discussed in the previous section, the role of scientists in water management should not be overlooked and the above provides another opportunity for CMAs to implement that principle. Using the average household income in a determined area would be a good indication of what price would be suitable to charge water users.

The Minister makes regulations that determine a CMA's eligibility for financial assistance, how that financial assistance should be applied for, together with the terms and conditions applicable to any financial assistance granted. As discussed in chapter 3, CMA establishment relies heavily on financial resources, especially in the beginning when infrastructure must be developed and new staff must be compensated. The decision to supply financial resources to a CMA is made solely at the Minister's discretion. From an ethical and practical perspective, this might prove worrisome. Supplying a CMA with financial resources is not a decision that can be made lightly because the Minister must be certain the CMA is sufficiently responsible to handle the money and that a proper financial structure is in place to use the money effectively. The money supplied to a CMA could be used just as easily for another purpose that could arguably justify its use better, which is why it would be wise to make use of an appointed decision-making body to determine whether financial support should be granted to a CMA. Experts in the water and financial sectors could form a committee to evaluate each application and to confirm whether a CMA satisfies the criteria they

[348] Section 27(1) of the Constitution.

determined and the NWA for successful financial management of a CMA. One of the principles identified in section 3.2 is that decisions must be thought through in a deliberate manner and that changes to water management must be made strategically. The matter of financial assistance is a good example of a decision that should be made in a deliberate and cautious manner because of the important implications for a CMA.

One of the principles identified in section 3.4 is that adaptive and integrated water management requires a diversification of financial resources using a broad set of private and public financial instruments.[349] The diversification of financial resources to include private financial instruments is not a reality for CMAs. According to Section 61(2) of the NWA, CMAs may only receive financial assistance from funds appropriated by Parliament or which may under the NWA or otherwise lawfully be used for the purposes in question. This means that CMAs may not use any funds that do not come from Parliament, which rules out any private financial support from individuals or companies. This restriction limits CMAs to applying for financial assistance through the legal NWA channels and implies that they would have to turn down other offers of financial support. Although there are downsides to privately funding a CMA, such as the possibility for corruption and money laundering, the Minister should also consider the benefits as it could potentially lessen the financial and administrative burden on Parliament to supply funds. Opening up the possibility for CMAs to receive private funding could speed up the establishment process and possibly help CMAs build capacity to take on more legal responsibilities. One of the other principles identified in section 3.4 is that CMAs should aim to become more financially independent of government, and if the Minister considers allowing private funding for CMAs then reaching the goal of financial independence could be achieved faster.

The process of creating a budget and including it in the CMA management plan is an important principle to emerge from section 3.4. This principle is given effect in Section 77(1)(e) of the NWA which provides that a proposal to establish a CMA must contain the feasibility of the proposed CMA in respect of financial matters. Although the NWA does not explicitly provide what aspects of a proposed CMA's financial matters should be included, it is safe to assume that it would include estimates related to insurance, travel, office supplies, internet costs, salaries or wages and office space rental among other expenses.

[349] See 50.

Another principle identified in section 3.4 is that the managing board of an institution must retain its financial records and keep them up to date. This provision is realised in Section 32(2) of the NWA, which declares that the board of a CMA must ensure that the chief executive officer of the institution keeps proper records and accounts of the activities, transactions and affairs of the institution and of the board, and any other records or accounts necessary to explain sufficiently the financial operations and financial position of the institution.

4.6 The operation of a catchment management agency

Section 86 in Part 3 of Chapter 7 of the NWA deals with the operation of CMAs by listing the instances in which a CMA may or may not delegate powers. The only powers a CMA may not delegate are the power of delegation and the power to set water use charges. As mentioned in various parts of this paper, CMAs may only perform duties or exercise powers once they have been delegated. This means that a CMA may only delegate a specific power once the Minister has already delegated that power to it. Giving a CMA the ability to delegate powers seems unnecessary at the present stage because most of the proposed CMAs have not been established and therefore powers or duties cannot be delegated. The inclusion of this provision within the NWA, however, makes sense for the future where CMAs are already operational and fully responsible for all the powers and duties assigned to them.

4.7 The powers of a catchment management agency

Part 3 of Chapter 6 and Sections 79 and 80 of Chapter 7 of the NWA deal with the powers relating to CMAs. The Minister remains in control of water management in areas where a CMA is not yet functional, even if it has been established. According to Section 72 of the NWA, all powers that have not been assigned to a CMA vest in the Minister. The two concepts of delegation and assignment are explained in section 2.2 of this paper.

A CMA may only perform a duty or exercise a power once it has been delegated or assigned to the CMA. Before assigning a power or duty to a CMA, the Minister must consider the capacity of the CMA to exercise the power or perform the duty, and the

desirability of assigning that power or duty.[350] Section 73(4) of the NWA states that the Minister must promote the management of water resources at catchment level by assigning powers and duties to CMAs when desirable to do so. The problem this raises is discussed in section 3.3. One of the principles from section 3.3 expresses that governments should consider delegating powers to CMAs early in the establishment process to test their capacity. The NWA does not provide for this principle, but instead proclaims that CMAs must demonstrate capacity before powers can be delegated to them. Central governments are often reluctant to delegate or assign powers before capacity has been demonstrated.[351] Without powers, however, there is no basis on which local authorities can gain the experience needed to build capacity or demonstrate that capacity has been gained.[352] This lack of capacity argument is often just an excuse to not delegate powers.[353] The problem arising from this section in the NWA is that the Minister must determine when a CMA has the capacity to exercise a power or perform a duty assigned to it, which will prove difficult because the NWA contains no capacity assessment guidelines. Assuming there were guidelines, it could still prove difficult because of the unique context within which a CMA would need to be assessed. For instance, some CMAs are located in predominantly agricultural areas while others are in urban areas, both of which are variables to take into account. The only way to overcome this problem would be to have a set of guidelines against which CMAs can be assessed or to simply delegate the function to a CMA from the outset as suggested by the principle to determine whether a CMA has sufficient capacity to perform the duty or exercise the power delegated to it. By delegating powers to CMAs before capacity can be demonstrated, government would give effect to the above principle.

The introduction to Chapter 7 of the NWA allows for the establishment of an advisory committee under Chapter 9 of the Act to develop the necessary capacity as a first step towards establishing a CMA and thereafter the rules that CMAs may make to regulate water use are set out in Part 3 of Schedule 3 of the NWA. As discussed elsewhere in this chapter, the processes laid out in some of the sections of the NWA are time consuming and involve the public even though inviting public comments in the decision-making process is not always the best solution. As suggested previously, an

[350] Section 73(3)(a) and 73(3)(b) of the NWA.
[351] See 80.
[352] See 80.
[353] See 80.

alternative to involving public opinion would be the use of committees to advise the CMAs in the setting up of rules and in the establishment process, which is given effect through this provision. A principle identified in section 3.5 is that stakeholders should have the knowledge to facilitate and initiate implementation processes. After a committee develops sufficient capacity, stakeholders should be encouraged to facilitate the establishment process to give effect to this principle.

According to Section 79(4)(a) of the NWA, in performing its functions, a CMA must, among other things, achieve equitable access for all to the water resources under its control. This is only one of the requirements mentioned in the NWA to which CMAs must adhere when performing their functions. The use of the word ‘must’ in this section implies a responsibility a CMA must fulfil. The problem with including such an absolute command is that when that expectation is not met, it leaves room to question the CMA’s abilities. It is nearly impossible to achieve equitable access for all to the water resources within a certain area due either to a possible lack of financial resources or to a lack of infrastructure; some people will always be at a disadvantage. This disadvantage may result from people being unsatisfied with the amount or quality of water they receive, or their proximity to the nearest water source. CMAs should strive for equitable access for all, but should keep in mind that it is a lengthy process and a goal that requires time to achieve. One of the principles that emerged in section 3.5 was that accountability and transparency are crucial at each stage of the CMA process. One reason why this principle should be incorporated in water management by CMAs is that it would ensure that CMAs are always upfront about their ability to provide water for citizens and that empty promises are not made that would result in distrust by communities. Individuals must be able to hold CMAs accountable for the functions they perform or CMAs may not follow up on promises or goals set, which would reduce the credibility of the CMA.

4.8 Intervention, disestablishment or change of a catchment management agency

Part 4 of Chapter 7 of the NWA enables the Minister to disestablish a CMA or make changes to its water management area for reasons that include the need to reorganise water management institutions for more effective water resource management. An agency may also be disestablished if it does not operate effectively.

Section 87 contains the conditions under which the Minister may take over the powers and duties of a CMA; it also lists the conditions under which the Minister may direct a CMA to undertake a certain action or withhold financial assistance from a CMA. Two of the listed conditions under which the Minister may direct a CMA to take a specific action are when the CMA is in financial difficulties or is otherwise mismanaged, or if the CMA has become redundant or ineffective.[354] When a CMA is mismanaged or becomes ineffective the Minister may direct the CMA to take any action that Minister deems necessary to remedy the situation. If the CMA fails to remedy the situation then the Minister will assume responsibility for that particular CMA function or duty. Only once the Minister is satisfied the CMA may resume exercising the power or performing the duty in a responsible manner will it be delegated back to the CMA.[355] Powers and duties being delegated and revoked, back and forth between the Minister and the CMA, is not ideal as the continuous shifting of powers is not conducive to successful management, and results in time wasted that would be better spent on building capacity to avoid the situation that led the Minister to revoke powers. The provision providing that the Minster may revoke powers should only be exercised in exceptional circumstances to avoid an unnecessary exchange of powers and resource wastage. Preparing CMAs to function effectively and creating an environment conducive to successful management is crucial to prevent this situation. One of the principles identified in section 3.2 is that central government should play a facilitating role in CMA processes to give CMAs more freedom to make decisions. The fact that Section 87 should only be enforced in exceptional circumstances gives effect to this principle. The Minister should be aware of irresponsible behaviour but should only revoke powers if there is severe mismanagement on the CMA's part.

One of the principles identified in section 3.6 is that decentralisation often involves a change in the institutional structure through which natural resources are managed. Section 88(1)(a) stipulates that the Minister may disestablish a CMA if it is desirable to re-organise water management institutions in an area in the interests of effective water resource management. This principle was given effect in 2012 when the originally envisioned 19 CMAs were restructured to make way for the nine new CMAs. The move from 19 CMAs to nine was inevitable because of insufficient capacity to manage all 19 CMAs; reducing the number of CMAs to nine proved a more practical option. Although

[354] Sections 87(1)(a) and 87(1)(g) of the NWA.
[355] Section 87(4)(d) of the NWA.

the restructuring to nine CMAs is a suitable and practical decision, the disestablishment process of CMAs should never be seen as quick fix to the problems of a CMA regarding water management in general. Disestablishing a CMA should be contemplated thoroughly because it uses time and resources to re-establish a CMA; if a problem is able to be solved in a manner to avoid disestablishment or restructuring then that route must be followed.

Also under Section 88, the Minister must invite written comments from the public and consider all comments before a CMA may be disestablished.[356] This provision does not seem practical because once the Minister has reason to believe a CMA must be disestablished there will not likely be sufficient reason by way of public comment to dispute such a decision. To determine that a CMA must be disestablished is likely to require detailed investigation into the CMA's operation and presumably this information would not be available to the public.

The last relevant provision, found in Section 90(2), conveys that in making regulations concerning CMAs, the Minister must take into account all relevant considerations, including the need to achieve adequate representation of and consultation with organs of state, bodies representing different sectors and other interests within the CMA's area of jurisdiction. This is just one example of what the Minister must consider when making regulations. This section clearly provides that the Minister may make any regulations regarding CMAs as long as all relevant considerations are taken into account, but it lacks a proper outline of what those other considerations might be. This omission means it would be difficult to hold the Minister accountable for his or her decisions in the making of regulations. This could undermine the principle introduced in section 3.5, which claims that mechanisms must be in place whereby national government can give feedback and be held accountable to lower levels of government. This principle is not realised in Section 90(2). In the context of this provision, there is no manner in which individuals can question the decision-making capacity of the Minister because there are no guidelines that communicate the criteria to consider when making decisions. As mentioned in some of the previous sections, allowing the Minister autonomy in making certain decisions may prove dangerous and a suitable solution is to have a well-structured and democratic channel through which decisions can be made.

[356] Section 88(2)(a)(ii) and section 88(2)(c).

4.9 Conclusion

As is evident from the discussions in this chapter, CMAs face a number of challenges potentially preventing them from conforming to the principles related to IWRM, the MTF and decentralisation as water governance and management models as set out in chapter 3. It can be argued that the main concerns appear to fall broadly into three categories: the lack of coherent and clear provisions, the length and practical viability of the processes required in some of the sections, and the extent of autonomy given to the Minister. These concerns are addressed in the paper's concluding discussion in the next chapter.

CHAPTER 5 CONCLUSION

Establishing CMAs is one of the ways in which the South African government hopes to manage water more sustainably and to distribute it more equitably. Decentralising water management to CMAs helps manage water in a localised environment, which can be more sensitive to the needs of communities and where management can be done on a more manageable scale. Although CMAs set out to achieve ambitious goals, they have unfortunately fallen short of achieving those goals in a timely manner and so the establishment of the 9 CMAs is still not a reality.

This paper set out to explore the principles of effective water management at catchment level, and how these principles are applied, if at all, in the South African water management environment. The concepts of IWRM, the MTF and delegation were introduced as three methods of water governance and management. Decentralisation usually includes the three categories of deconcentration, delegation and devolution and is the process whereby powers or functions are shifted from one level of government to another, lower level of government. IWRM is defined as a process that promotes the coordinated development and management of water, land and related resources to maximise economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.[357] It is designed to replace the traditional, fragmented sectoral approach to water resources and management that has led to poor services and unsustainable resource use.[358] Developed by California's Orange County Water District under the NeWater project, the MTF is an interdisciplinary conceptual and methodological framework supporting the analysis of water systems, management processes and multi-level governance regimes.[359] The framework was developed via a participatory process involving a wide range of researchers from different disciplines and it combines different conceptual approaches to water management into a meaningful whole.[360]

With the introduction of each sphere of water governance in chapter 3, the main source of a lack of good governance and management was introduced. By asserting the opposite, the most noteworthy principles for achieving effective governance and

[357] See 24.
[358] See 24.
[359] See 161.
[360] See 162.

management to mention from each subsection in chapter 3 are that integration of water related tasks across and within ministries and public agencies with a strong emphasis on good communication is important; that sufficient scientific and technical expertise and infrastructure for designing and implementing water policies should be developed; that stable revenues to implement water policies across ministries and levels of government must be available; that a lack of transparency, institutional quality and integrity in water policy making should be removed; and that there should be a link between hydrological and administrative boundaries.

The three main areas of concern in the NWA identified in the previous chapter that would prevent CMAs from being able to implement the above principles are the lack of coherent and clear provisions, the length and practical viability of the processes required in some of the sections, and the extent of autonomy given to the Minister. To address these three concerns will probably not be an easy task and the solution to one concern may not be fitting to the other two concerns. To attend to the first concern might prove the least difficult. Establishing coherent and easily understandable provisions for CMAs would help a great deal to avoid confusion and to guide CMAs in the correct manner regarding the process of CMA establishment. As for the second concern on the length and practical viability of some of the processes required in the NWA, a good idea would be to re-evaluate the processes proposed in the NWA for CMAs to make certain decisions especially those involving public comment. All redundant processes should be removed and any unnecessary regulations that obstruct efficient and fast decision-making should be reconsidered. It was proposed several times in this chapter that the Minister should establish permanent or temporary advisory committees to assist in making decisions. This suggestion could be fitting for both the second and the third concerns. By establishing committees, expert insight and knowledge can be gained by CMAs that could eliminate lengthy processes. Also, establishing these committees would result in more fair and democratic decision-making to a certain extent and it would follow that the Minister would be able to pay more attention to other urgent matters as they emerge.

Even though CMA establishment is behind schedule and those already established are not yet operational, there is still hope that CMAs as institutions can be successful in managing water efficiently and effectively within South Africa. By adopting the principles for successful water management at catchment level put forth in this

report and by re-evaluating some of the provisions in the NWA to include more practical guidelines for establishing successful management practices may go a long way towards putting CMAs in a sustainable position to manage water resources successfully.

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APPENDIX 1 – SUMMARY OF THE ASSESSMENT MATRIX

Policy sphere	Capacity sphere	Funding sphere	Accountability sphere	Administrative sphere
Various levels of decision-makers need to be in agreement regarding management plans.	A strong technical foundation and effective institutions should be the core of any successful change process.	Adaptive management and IWRM require a diversification of financial resources using a broad set of private and public financial instruments.	Open and shared information sources that fill gaps and facilitate integration must be developed.	Water resource planning and management must be linked to a country's public administration framework.
Decisions must be deliberately thought through and changes made strategically.	Skills should be taught to local communities to empower them to manage water resources.	An institution's managing board must ensure all its financial records are retained and up to date.	Stakeholders should have the knowledge to facilitate and initiate implementation processes.	Smaller units within a CMA would make sense because there are several components to efficient water management.
Information must be easily shared across levels of government.	Institutional capacity must be developed at district level.	The process of developing a budget must be included in an institution's business plan.	Powers should be transferred within a CMA's capacity.	Successful decentralisation must work with democratic reforms.
There must be clear division between different administrative and decision-making levels.	CMAs should advance more consistent approaches to modelling and analysis across their organisations.	CMAs should aim to become financially independent from government.	Accountability and transparency are crucial at each stage of the CMA establishment process.	Decentralisation involves a change in the institutional structure through which natural resources are managed.
Central government should play a facilitating role in the CMA establishment process in order to give CMAs freedom to make decisions.	CMAs should develop an analytical ability to characterise, communicate and understand uncertainties associated with integrated modelling.	CMAs should explore various plans to ensure that some of their revenue is reinvested in long-term sustainable water management practices.	Mechanisms must be in place whereby national government can give feedback and be held accountable to lower levels of government.	Water resource planning must be linked to a country's overall sustainable development strategy.

Policy sphere	Capacity sphere	Funding sphere	Accountability sphere	Administrative sphere
A clear policy is required to specify the way in which information must be shared.	Institutions should enable more transparent decision-making supported by new tools and sound scientific analysis.	CMAs must aim to increase their funding yearly and to make investing attractive to private entities or individuals.	Local and provincial governments must have access to politicians and must have input into new policies and plans.	Tools must be developed to enable decision makers to think in different ways and to ultimately come to more integrated decisions.
Powers and duties should be assigned to CMAs instead of delegated because it validates the CMA's capacity.	Government should consider delegating powers to CMAs early in the establishment process to test capacity.	CMAs should motivate stakeholders to take part voluntarily in CMA activities.	There must be agreement among stakeholders to compromise on certain aspects to move forward with CMA establishment.	CMAs should have a single coordinating body where data can be centrally collected, managed and shared.
Continuous learning should take place among and within CMAs to expand knowledge.	The technologies available to develop adaptive systems must be put into action.		Strong leadership is required to ensure the focus remains on the positive elements of a project.	Having complete division between and clarity on the roles of every CMA division will avoid confusion.
CMAs should collaborate regularly with other CMAs or government levels to encourage mutual growth.	Institutions must have the technical expertise to deal with the risks associated with water management.		CMAs must operate within the parameters of legislation.	
Common areas of interest must be identified among stakeholders instead of focusing on the conflicts.	The role of scientists should not be overlooked in the CMA establishment process.			
Internal processes must be evaluated to create an environment conducive to effective communication.				